

Railway Age

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SAFETY ACCO CHAINS

EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

We publish elsewhere in this issue a very interesting interview which Commissioner Clark, of the Interstate Commerce Commission, has given to the

Commissioner Clark on the Rule of Rate Making

Baltimore Sun on the subject of the rule of rate making which should be adopted in the pending railroad legislation. Commissioner Clark points out that with an operating ratio of 85 per cent or more it is clear the railways must have an advance in rates if they are to remain solvent and expand their facilities under private operation. He avoids advocating the exact provisions of Section 6 of the Cummins' bill, which in effect provide for the appropriation for general railroad purposes of two-thirds of the earnings over 6 per cent which may be made by any individual railroad. On the other hand, he makes clear that he believes it is expedient for Congress to provide that rates must be so made as to yield an average return of $5\frac{1}{2}$ or 6 per cent for the railways as a whole, and that in the case of railways earning more than this some part of their surplus earnings should be taken away. He repudiates the idea that any part of the earnings taken from the more prosperous roads should be given to the unprosperous ones. We infer from his reference to the present policy of the government in taxing excess profits that he would prefer to see any part of the surplus earnings of the stronger lines taken by the government taken in the form of taxes rather than in any other way, although perhaps this inference is not justified. Whether our readers agree with Mr. Clark or not, they will, we believe, find the views that he expresses illuminating and constructive.

The Union Pacific's order for 4,000 refrigerator cars placed last week should serve as a good beginning for the purchasing of cars and locomotives, which is

The Equipment Market

apparently scheduled to take place as soon as the railroads are returned to their owners on March 1. The order is, with the exception of the Union Tank Car Company's orders for 5,500 tank cars placed last year, the largest domestic order which has been placed since the standard cars were ordered by the Railroad Administration in the spring of 1918. It is the largest which has been placed for any American railroad system since the orders for standard cars. It is not the Union Pacific's order for cars, however, which one takes to indicate a forthcoming buying movement in cars and locomotives so much as the Equipment and Supplies column of the *Railway Age*, which we have often had occasion to refer to as the barometer of the railway supply field. The orders which have been reported in the Equipment and Supplies column so far this year have not, it is true, been of record-breaking calibre, but the number of items covering both orders and inquiries is a clear indication that the great buying movement we have been reading about in the papers is at last by way of reaching the railway field, and that apparently orders are soon to be expected in considerable amounts. During January orders were reported in the column for 32 locomotives, 6,220 freight cars (including the Union Pacific order) and 25 passenger cars for domestic service and 213 locomotives and 1,080

freight cars for export. At the beginning of this week there are outstanding, however, inquiries for 266 locomotives, approximately 5,500 freight cars and something like 300 passenger cars for domestic service as well as a number for export. The barometer, to say the least, is rising and indications are for good weather ahead.

There is little doubt that, following the return of the railroads to private control, a strong and justifiable plea will

A Comparison of Railroad and Other Charges

be made by the owners for increases in rates. Similarly it is probable that strong arguments in opposition to any advance in rates will be made by shipping interests before the Interstate Commerce Commission. The *Railway Age* in the past has pointed out the fallacy of the popular theorem that railroad rates are extortionate. It does no harm to call attention to the matter again. Comparative figures are illuminating, even though familiar to the practical railroad man. A railroad carried a box of hosiery valued at \$225 a distance of 60 miles for 52 cents. The drayman who carted it one-eighth of a mile received 50 cents for his service, and a merchant made a profit of 50 cents on the first pair of ladies' hosiery sold from the box. A car of coal was transported 110 miles at the rate of \$1 per ton. The teamster charged \$1.50 for delivering the coal a distance of a half mile. A shipment of household goods was carried 70 miles for \$7 by a railroad. The moving-van operator received \$6 for carrying the same goods one mile. A sack of grass seed was transported to a point 125 miles distant for 69 cents. The seed was valued at \$38, and had the sack been punctured accidentally and even two pounds lost, the claim for the loss would have exceeded the total charge for transportation of the seed. A shipment of canned goods consigned to 65 retail merchants of a certain city was delivered from a point 80 miles distant. The freight rate was less than 1 cent per can, yet the merchants realized, by sale, 6 cents per can more than the canned goods cost them. From the superintendent to the section hand, each railroad employee should use every occasion to explode the "rate extortion" myth by comparisons such as these.

The Railroad Administration suggested that one trust company be appointed trustee for the equipment trust certificates

Trustee for Equipment Certificates.

which are to be issued to finance the equipment purchased by the Railroad Administration and assigned to the various railroad companies. The profit involved to a bank in acting as trustee for a mortgage is generally not very great, although, of course, in the present case the size of the mortgage, being between \$300,000,000 and \$400,000,000, makes the aggregate sum paid to the trust company considerable. Furthermore, there is rightly a prestige attached to this particular case that brought out keen competition between the largest of the banks with trust departments. Only a bank with a large trust organization could adequately perform the service of trustee

under a mortgage covering 2,000 locomotives and 100,000 freight cars owned by different railroads in different parts of the country. The largest of the New York trust companies are the Guaranty, Central Union, Bankers, and Equitable. The National City Bank also now has a trust department. In Philadelphia there is the Commercial Trust Company. All of these probably made a bid for the trusteeship of the equipment trust certificates. The decision was left to a committee of the Association of Railway Executives, and the Guaranty Trust Company of New York was selected. This selection is subject to the approval of the members of the association, but there were representatives of the various financial interests on the committee itself, so that its opinion ought to be representative of the opinion of the association. As indicative of the keenness of the competition for the honor, some of the competitors of the Guaranty are suggesting now that the trusteeship should be divided up and parceled out among three or four or more trust companies. A splitting up of the trusteeship might quite possibly increase the expenses and detract from, rather than add to, the effectiveness of the supervision of the trustee.

Why the Railroads Need a Loan from the Government

THE PROBLEM of providing railroad service adequate to handling the commerce of the United States is not one of providing for meeting the requirements of some future time, but one of meeting a situation which is acutely pressing at this moment. The railroads cannot handle all the traffic which is being offered to them now. With almost no new facilities being provided, and the existing facilities being subjected to the severest service, our transportation facilities are actually becoming smaller while the demands upon them are growing larger. The question presented is not merely how the railways are going to be enabled to handle the traffic next year, or the year after, but also how they are going to be enabled to handle it in 1920.

If constructive legislation for the return of the railways to private operation had been passed six months, or even three months ago, the conditions confronting the country would not be so bad. But apparently the new legislation will not be passed much before the roads are returned on March 1. If the companies are to be able to provide new equipment and other facilities in time to be of any use in 1920, they should begin placing orders for this purpose immediately after the roads are returned to them. Orders which are delayed for months, or even for weeks, after March 1 cannot be filled before the heavy business of the fall and winter of 1920 will have to be moved.

The mere passage of legislation, however good, will not be enough to restore railroad credit sufficiently to enable the companies to go into the market and place orders immediately on the large scale on which they ought to be placed. Even after the proposed legislation shall have been passed, the position of the companies will not be strengthened, as it must be, until some unmistakable indications have been given as to what advance in rates will be made. But if large orders are not to be placed until a rate advance case can be fought out, it will be some months before they can be placed.

Congress, however, has it within its power to enable the railway companies to place immediately after the new legislation is passed substantial orders for equipment and other facilities. To provide merely for the replacement of the number of locomotives and cars normally retired, the companies should order at once at least 100,000 freight cars, 2,000 locomotives and 4,000 passenger cars. This equipment, the statistics of the last 14 years show, will be needed merely to replace equipment which in the normal course of events

should be retired in 1920. In other words, it is needed, not to make up the deficiency of equipment now existing, but to prevent the amount of equipment in service from being actually reduced. The number of cars and locomotives mentioned would cost, at present prices, about \$500,000,000. In order that the railway companies may be enabled to order them at once, they must be afforded at once the capital necessary to buy them. Apparently, there is only one way in which this can be done, and this is by Congress providing by legislation for the making of an immediate government loan to the companies of not less than \$500,000,000, and preferably of \$750,000,000, this amount to be returned to the government as soon as the credit of the companies is re-established.

It is in no spirit of criticism of Congress that we say that the conditions which have rendered it desirable, or even necessary, that the government should make a large loan to the railway companies have been created by Congress itself. They are due to the delays which have occurred in the consideration of the railroad legislation. If, as we have indicated, satisfactory legislation had been passed some months ago the question of advances in rates could have been taken up and disposed of, and the companies would have known early in the year 1920 just where they stood. Regardless of the causes of the delays in the consideration of the legislation, the delays actually have occurred, and now with March 1, when betterment and improvement work of all kinds should be actively begun, only three weeks away, what legislation is going to be passed and what rates the companies are going to be allowed to charge are still unsettled.

The need for action which will enable the companies immediately to place orders for equipment which will at least provide for the normal annual replacements, is not merely a railroad need.

It is a public need, because unless the railways get soon at least the amount of equipment which has been mentioned they are going to be worse handicapped in handling commerce in 1920 than they ever have been before. While Congress is considering the broader phases of the problem of railroad legislation, it should recognize the fact that in the interest of American industry and commerce, and therefore in the interest of the entire people, it should adopt special measures to enable the companies to begin at once the work of rehabilitation.

The Crucial Test—Will Private Management Meet It?

PPRIVATE OWNERSHIP and operation of railways in the United States is going to be put to the severest test beginning on March 1, 1920, to which it has ever been subjected. The existing facilities of the railways are inadequate to the handling of the present and prospective freight traffic, no matter how efficiently they may be operated. To secure the greatest practicable efficiency will require the exercise of the greatest possible ability, initiative and resourcefulness by the managements of the individual lines and close and unselfish co-operation by the managements of all the railroad companies.

The ablest and most efficient practicable operation of the individual lines will require the building up by the various companies of the strongest possible organizations. This, in turn, will require that all appointments to and promotions in the organizations shall be based upon the experience and ability of the men appointed or promoted. This has been the usual but not the universal practice upon American railways. There always have been some cases where favoritism in different forms has played a part, and of course wherever it has played a part the results have been harmful.

When government operation was adopted the government

took into its service most of the able railway managers, although it made the mistake of excluding from its organization numerous men whose experience, training and ability were such that it should have spared no effort to secure their services. With the return to private operation approaching most of the able men who have served the government are being invited to return to the service of the companies. The net result of the developments probably will be that after the railways are returned the official personnel of most roads will be as strong as, or stronger than, it ever was.

There are some cases, however—fortunately, not many of them—where, in the building of the new organizations, other considerations than experience and proved ability seem to be important factors. These cases are attracting much attention in the railroad world and are being made the objects of criticism by railway officers, high and low. The motives and acts of railway directors and executives should under present conditions be as much above suspicion as Caesar insisted that the virtue of his wife must be. Any failure on the part of directors and executives in rebuilding their organizations to act exclusively on the principle of endeavoring to secure for their stockholders and the public the most efficient operation and the best service will react injuriously, not only upon the managements of individual railways, but on the railways as a whole.

The managements of most companies seem to realize that the highest degree of co-operation between the various railways as well as the highest measure of ability in the management of the individual properties will be requisite to the success of private operation. But unfortunately there are some managements which apparently have been so filled with resentment by certain methods which have been adopted under government operation that they are disposed to disregard or deny the need for a greater degree of co-operation than that which formerly existed under private operation, and to return to many of the extreme competitive and uneconomical practices which formerly prevailed. Some of them apparently would be in favor of abolishing all centralized control of the distribution of freight cars, all joint operation of terminals, all consolidated city ticket offices, and of re-establishing all the outside traffic agencies which formerly existed. A large majority of railway officers seem to have learned some important lessons from the experience of the last three years, but some apparently have not.

The future of the railways of the United States is partly in the hands of Congress and the Interstate Commerce Commission and partly in the hands of their directors and executive officers. The companies are very properly demanding that Congress and the Interstate Commerce Commission shall deal fairly with them. At the same time Congress, the Interstate Commerce Commission and the public have a right to demand, and will demand, that the directors and executives shall deal intelligently and fairly with their stockholders, other railroads and the public. The terrible experience through which the railroads have passed during the last 10 or 15 years has been largely due to the fact that the managements of a few railroads have not dealt thus, and that by their failure to do so they have brought unjust discredit upon the managements of the railroads as a whole. The managements of this comparatively small number of railroads have not only rendered it impossible to defend what they have done, but have made it extremely difficult, and, indeed, almost impossible, effectively to defend private management as a policy.

The main reason why the railways are going back to private management on March 1 is that the results of government operation have been so disappointing to the public. The only sure way to perpetuate private management will be to so conduct it in future as to avoid the unjust grounds for criticism of it which have so often been afforded in the past.

The Net Results of the National Safety Drive

"SAFETY FIRST" is not an exact science. Figures in enormous quantities have been published to impress the careless—and all of us—with the reduction that the safety specialists have caused to be made in the monthly and annual totals of bodily injuries; and these do, indeed, help us in our efforts to grasp a rather elusive subject; but at best they affect our thoughts only indirectly. Manager Duffy, of the Safety Section of the Railway Administration does well, therefore, to emphasize what may be called the non-mathematical aspect of the benefits of the recent "drive" for National Railroad Accident Prevention. Some of the other aspects have apparently been twisted, not to say distorted, into a shape leading to unwarranted conclusions. No great harm has been done; but it is just as well to train our eyes to see straight. Mr. Duffy says, in his congratulatory letter to the regional safety officers and to the individual railroads:

"We have received some glorious reports of results that cannot be embodied in the tables. The figures tell but a small part of the story; they do not and cannot show the real outstanding fact of the accidents that were actually prevented and that will be prevented by reason of the education gained during these intensified efforts. Facts were brought out that will be helpful in locating unsafe persons as well as things. Gains have been accomplished which might not have been striven for in the ordinary everyday easy processes of standing still, or mild progress. The team work and intense enthusiasm has done much to humanize railroading, for it has brought the higher officers in intimate personal touch with the lowest workers. See to it that the lessons taught and learned are a permanent inspiration and guide for the future; to stop now would be like sowing for a bountiful harvest and not reaping when matured."

It is, indeed, wonderful; the word is not misused. On the other hand, our "every-day easy processes of mild progress" are wonderful. It is a wonder that, knowing better, we are so careless of our lives and limbs and most of our possessions. Why do brakemen on freight cars go on doing the risky things which, by the *witness of their own eyes*, they know to have led to the death of a fellow brakeman within a month? If the circumstances of a fatal accident to a trainman are learned by hearsay instead of by ocular evidence they will fade out of the mind of fellow trainmen in a few days—perhaps in a few hours.

In view of the prevalence, everywhere, of these very human traits, it is, indeed, a matter for hearty congratulation when anything—reasonable or unreasonable, matter-of-fact or fancy, expensive or inexpensive—can be done to lessen the distresses of body and of mind which our hospital records pile up in such enormous aggregate figures every year.

The twisting and distortion to which we have referred is observable mainly in the adoption of unwarranted and deceptive comparisons. The first error is in forgetting what a very small proportion of the employees, even in the most dangerous occupations, are likely to sustain bodily injuries in any one year. Freight brakemen, let us say, are injured (on the average) once in ten years, or 520 weeks. In two weeks, therefore, the chance (not the certainty) is that one man in 260 will be injured. This makes an average for two weeks a very intangible thing; it has little effect on any but studious minds. Many of the items in Mr. Duffy's final statement show ciphers in both columns, last year and this year. Figures do not lie; but ciphers may deceive by silence. By taking a very large number of men, spread over a large territory, the averages of even a short period of time will make an instructive picture, but the comparison must not be pressed too far. Some well-managed roads

showed losses in safety, instead of gains, when this comparison was made between periods of only two weeks each.

Comparisons between railroads may be vitiated by any number of conditions not measurable in figures. S. M. Metcalfe, superintendent of the Safety Section of the Northern Pacific, has called attention to the fallacy of making comparisons on the basis of the decrease in casualties. To present a more satisfactory comparison he has prepared a statement in which the casualties are shown in percentages of the number of men in service. If a railroad had a poor record last year, and an exceptionally good one during the period of the "drive," it shows a large percentage of decrease in casualties, while other roads whose casualty record was good in both periods take, on that basis, a lower position in the list. Mr. Metcalf's compilation for the two weeks of the drive is as follows:

EMPLOYEES KILLED AND INJURED, OCTOBER 18-31, 1919.

Rank	Name of Railroad	Casualties	
		Number of employees	per 10,000 men employed
1.	Atlantic Coast Line.....	24,307	3
2.	Union Pacific.....	33,200	7
3.	Illinois Central.....	52,222	12
4.	Seaboard Air Line.....	16,647	4
5.	Southern Pacific Company.....	49,778	15
6.	Chicago, Burlington & Quincy.....	56,334	29
7.	Delaware, Lackawanna & Western.....	25,369	13
8.	C. M. & St. Paul.....	71,550	43
9.	Southern R. R. Lines.....	62,587	44
10.	Denver & Rio Grande.....	12,162	9
11.	Norfolk & Western.....	31,317	25
12.	Northern Pacific.....	34,921	30
13.	Delaware & Hudson.....	15,390	13
14.	Penna. Lines West.....	88,114	76
15.	N. Y., N. H. & Hartford.....	38,876	34
16.	Pere Marquette.....	11,460	11
17.	Atchafalaya, T. & Santa Fe.....	46,965	46
18.	Chesapeake & Ohio.....	25,400	25
19.	Great Northern.....	39,914	41
20.	Erie.....	37,724	39
21.	Chicago & Eastern Illinois.....	10,424	11
22.	Michigan Central.....	23,434	26
23.	Missouri, K. & T.....	12,786	15
24.	Chicago, St. P. M. & O.....	10,125	12
25.	Boston & Maine.....	30,337	36
26.	Minneapolis, St. P. & S. S. M.....	15,858	19
27.	Central R. R. of N. J.....	16,500	21
28.	Baltimore & Ohio.....	76,802	102
29.	Lehigh Valley.....	26,366	35
30.	A. T. & S. F. Coast Lines.....	15,239	21
31.	Gulf, Col. & Santa Fe.....	10,821	16
32.	Penna. Railroad.....	185,138	276
33.	Rock Island.....	44,419	66
34.	Chicago & North Western.....	54,539	87
35.	Philadelphia & Reading.....	34,143	56
36.	St. Louis-San Francisco.....	26,454	51
37.	C. C. C. & St. Louis.....		
38.	New York Central.....	99,534	199
39.	Louisville & Nashville.....	49,039	101
40.	Texas & Pacific.....	13,782	31
41.	M. K. & T. of Texas.....	11,452	26
42.	Southern Pacific Lines.....	19,982	50
43.	Missouri Pacific.....	39,495	125

It is desirable to reflect on the points here brought out, that we may give them their true weight. The political candidate says that his platform is like the platform of a passenger car: to get in by, but not to travel on. We may say that these columns of figures are a good thing by which to get in—to the workman's mind; but as a permanent thing in his every day thoughts they may not have great vitality. He must have something more human. The motion-picture car, with its safety story, has, no doubt, aroused thousands of minds which were not touched by figures, and very little touched by ordinary lectures. The silver cup given by B. F. Winchell, regional director at Atlanta, and the banner awarded by R. H. Aishton, of the Northwestern region, were manifestations of a good idea. These may seem a little too much tinged with fancy for such a prosaic business, but they may be trusted to serve a good purpose. When one good road shows ten or twenty times as many casualties per thousand men employed as are reported by another road equally well managed we may be sure that our studies must embrace something besides tables and figures.

Mr. Duffy, in his enthusiasm, refers to the "glorious reports" received from this, that or the other railroad. But he is speaking forth only words of truth and soberness. No fault can be found when he breaks away from tabular sta-

tistics, with a view to getting at our hearts. But at the same time each man has the duty of "punching the time clock" on his own mental habits—things that no foreman can get at—every day and every hour. Self-congratulation, within bounds, may do no harm; but words alone do not get us anywhere. One of the significant statements of Mr. Duffy's review is that the drive exposed "unsafe persons" as well as unsafe things. The unsafe person, if a pronounced case, needs to be put out of the service, for the good of the rest of the employees. It is everyone's duty to keep as far as possible from getting into that class. In short, the duty to make safety the first consideration presses on all sides. The conscientious workman aims to be a "safe person" for the benefit of his own reputation; also because it is a duty to his employer; and also because of his devotion to his family. And, conscientiousness aside, he has good reason to avoid bodily injury just on the basis of common selfishness!

Accurate Cost Data Needed

IN MAKING CLAIMS for the relative advantages of steam and electric locomotives much care must be exercised in presenting accurate figures and in presenting them in such a manner as to avoid misinterpretation. Two years ago E. W. Rice, Jr., president of the General Electric Company made the following statement:

"It is estimated that something like 150,000,000 tons of coal were consumed by the railroads in the year 1917. Now we know from the results obtained from such electrical operation of the railroads as we already have in this country that it would be possible to save at least two-thirds of this coal, if electric locomotives are substituted for the present steam locomotives."

Evidently Mr. Rice meant that most of this coal could be saved by the use of water power, as a modern steam locomotive can develop power under test conditions at about $2\frac{1}{4}$ pounds of coal per horsepower hour, while the manufacturers claim that it is possible to deliver power to the rail with an electric locomotive for something less than 2 pounds per horsepower hour. The electric locomotive in this case is supplied with power from a large steam plant and the value of $2\frac{1}{4}$ pounds for the steam locomotive does not include stand-by losses.

Mr. Rice's statement has since been used many times by advocates of electrification to show why steam roads should electrify and in so doing they have fallen badly into error. For example, a well-known technical publication recently interpreted the statement as follows:

"It has been conservatively estimated that one pound of coal when burned under boilers in a modern electric power house will do the work of three pounds in the steam locomotive, and the showing is even better in such severe climates as that which exist in the northwest. On the basis of present consumption this represents roughly a saving of one hundred million tons of coal annually."

If such a comparison is to be made, electric locomotives should be compared with the best of steam locomotives, since new electric motive power must compete with the most modern steam equipment. Saving the nation's coal is a worthy cause, and the railroads will support it if they can at the same time see a saving in ton-mile costs. Ton-mile costs unfortunately involve a host of details other than fuel costs. Complete costs of electrical operation must be obtained which are entirely separate from those for steam operation. Such data when produced will greatly assist in solving a much-mooted question and will be of tremendous value to all roads considering electrification.

Letters to the Editor

Credit for Excellent Results in Creosoting Due J. W. Putman

NEW YORK CITY

TO THE EDITOR:

I was very much interested in the article in your issue of January 16 in regard to the long life of the creosoted piles in the Louisville & Nashville trestle at Henderson, Ky. Several years ago I had occasion to call attention to the excellent results obtained from the piles used in the construction of the railroad wharf at Cartagena, Colombia, in the waters of the Caribbean Sea where the teredo are very destructive. I was therefore particularly interested in learning from your article that the creosoting of the trestle at Henderson, Ky., was done by J. W. Putnam, who I believe was also responsible for the good work done on the piles used by us in Colombia in 1892 and much other work done about that time. I think that while the explanation of the long life is undoubtedly due in part to the heavy creosoting, Mr. Putnam should be given a great deal of credit for the very intelligent, careful and conscientious work which he did in those early days.

F. LAVIS.

The Need for Automatic Train Control

NEW YORK CITY.

TO THE EDITOR:

- December 15: "FIVE KILLED; EIGHT OTHERS HURT; fastest passenger train on Norfolk & Western in smash-up."
 December 20: "TWENTY-THREE DEAD, THIRTY-FIVE HURT, in Maine rail wreck; engines met head-on."
 January 25: "FIFTEEN DEAD IN CRASH ON CANADIAN ROAD. First section of Vancouver Express sleeper telescoped by engine of second section."

These recent news headings, telling the all too familiar story of butting collisions, are but typical of that class of accidents which are not only preventable but the continuation of which is absolutely inexcusable. The pertinency of this opinion is sufficiently emphasized by the special report of the government automatic train control committee, and the annual reports of the Interstate Commerce Commission and of the Up-State Public Service Commission of New York, all urging automatic train control.

As you are aware, the first report was for a time suppressed; and as the refusal to publish it was practically coincident with the presentation of a memorial on the railway bill to the Senate and House conferees by Mr. A. P. Thom, purporting to represent the Association of Railway Executives, in opposition to the inclusion in the bill of the mandatory clause in the Esch bill relating to automatic train control, I promptly demanded, as an interested party, that the report should be made public.

Mr. Thom's quotation of authority for the opposition to this vital improvement was singularly inapt. It was as follows:

Perhaps there is no man in the country better qualified to give an opinion on the practicability of installing automatic train stops than General S. M. Felton. He states that there has been no automatic control device yet developed that meets the specifications of the Engineer Section of the American Railroad Association, and he doubts if there ever will be. He declares that "It is an utterly impracticable scheme; it removes the responsibility of handling the train from the enginemen, and we would have much more serious accidents than we now have. An engineer would not have to be awake, alert and on the job all the time, because he would soon depend on the automatic device to protect him."

Mr. Felton's experience as a railway administrator, emphasized by the high position which he held as such in the

military service of the government, may be freely admitted but this does not qualify him as an authority on the subject of automatic train control. When he states that automatic train control is an utterly impracticable scheme, and expresses the conviction that nothing can be devised to meet the requirements which have been time and again officially listed, he ventures into a field of prophecy already contradicted by accomplished facts.

The same profession of impossibility of engineering accomplishment has steadily opposed every radical improvement in railway equipment and operation; in the face of which the air brake has been developed, the car stove has been discarded, the automatic car coupler has been prescribed, the automatic block signal system has been installed and steel cars are taking the place of wooden ones; and grade crossings, despite the prophecy of bankruptcy by the head of one of the most important roads entering Chicago, have been abolished in that city.

Mr. Felton's statement that automatic train control, limited in his vision to a "device," would remove the responsibility from the engineman and be productive of more serious accidents, is simply an opinion. It is not supported by experience with regard to the installations already made, whatever their shortcomings, and utterly mistakes the psychology of an engineer when the intent and action of a proper system is considered.

Contrary to his assertion, I unhesitatingly affirm that automatic train control—not an automatic "stop," but a system which will marry together the braking system of a train and the wayside signals, which are in fact themselves automatic and take the place of direct visual study of track conditions—will not only safeguard trains from collisions in case of the inability of the engineer to see, understand and obey his signals, and from dangerous speeds on curves and cross-overs, but will tend to make him even more alert and capable, than at present.

Automatic train control is not only a necessity; it will prove one of the most important improvements in railway operation. Its inevitable adoption on sound lines will, of course, be facilitated when railway administration and operation approach the subject with more open minds, and when an administrative government body is empowered to enforce decisions as to safety equipment arrived at by competent technical and operating officials.

It may be further prophesied that the new conditions which will surround the return of the railroads to private operation will bring home to both their officers and boards of directors a more intimate appreciation of at least the moral responsibility for preventable accidents.

I think I am safe in confirming the statement which appeared in your news columns, that with regard to the objection raised before the conferees, it will fail in its purpose; and the final railway bill will reserve to the government the power to enforce its recommendations in the matter of automatic train control.

Perhaps I may be permitted to refer very briefly to a couple of comments in your editorial columns, the first referring to the manner and place of development and the second seemingly implying that the collisions which have occurred would have been averted by the use of visual block signals.

If you mean by "congested territory" the terminals of a great railroad I am heartily in accord with you that automatic train control at first should not be installed in such locations. It is not needed there, except to a limited extent, because trains being taken in or out of a terminal are moved at moderate speeds over a complication of switches, and the engineers and firemen are both specially alert. The place, however, for development is not out "in the country somewhere," on a somewhat indeterminate section of road, but upon a thoroughly typical section, where all kinds of signal

and interlocking apparatus are in use; where there are multiple tracks, switches and cross-overs, and where the traffic comprises both passenger and freight trains of a variety of character. It is only under such conditions that the full operation and benefit of automatic train control can be realized, and on the operation of which judgment can finally be passed.

In your issue of January 23, referring to the Accident Bulletin of the Interstate Commerce Commission for the calendar year 1918, you said:

In what may be considered its most important feature—persons killed in train accidents—the present report affords a sobering comparison: Two hundred and twenty of the 286 passengers killed in 1918 met their deaths in collisions, a fact which should give point—if anything further is needed to give point—to the report of the Train Control Committee noticed in the *Railway Age*, page 227. This committee, by the way, makes one of its most significant suggestions in a paragraph which the director of the division of operation had not asked for—the one to the effect that on a large mileage of American railroads, the first thing is not for refinements, like the automatic train stop, but for the simple block system.

With regard to the use of automatic block signals, no one of ordinary sanity will question their usefulness; but that their introduction will stop collisions is an inference not borne out by facts, for, as it has been frequently pointed out by the Bureau of Safety, disastrous accidents of this character are as frequent in block signal territory as in any other.

In this connection permit me to call attention to the conditions shown in a later document, the annual report of the Interstate Commerce Commission for 1919, in which it is stated that in the year ending June 30, 1919, among the accidents investigated there were 53 collisions, with 261 deaths and 1,083 injuries. Of these 53 collisions 28 occurred on roads equipped with some form of block signal system, 19 on roads with the time-table and train order system, and six in yards. In other words, the majority of collisions, with resulting deaths and injuries, occurred in block signal territory; hence there is not the slightest reason to assume that if the roads which operated on the train order system had been equipped with block signals there would not have been as many accidents as actually occurred.

Both automatic train control and the automatic block signal system are based upon the same fundamentals. Ordinarily they should go hand in hand, the one a supplement to the other; but undoubtedly there are conditions in which there may, with entirely satisfactory results, be a combination of automatic train control with an abbreviated wayside signal system.

FRANK J. SPRAGUE.

An Audible Cab Signal

NEW YORK CITY.

TO THE EDITOR:

In your issue of January 30, we noticed a letter from a correspondent at Buffalo, N. Y., Mr. E. Adams, on the need and value of an *audible* signal to supplement the visual signal.

For the information of your correspondent, and all others interested in this matter, we desire to say that our automatic train stop does just that very thing, by giving an audible signal at every distant signal by means of a whistle in the engine cab, the length of the whistling showing whether the visual signal indication was "clear" or "danger."

The action of the device is direct and infallible. By an upward movement of only one-half inch, as the contact shoe glides over the ramp, the plunger opens the air valve that releases the train-pipe air, whose escape blows the audible signal whistle. If the signal indication is "clear," the downward movement of the plunger, as the contact shoe leaves the ramp, closes the air-valve, after a short audible signal has been given, but before any braking action is begun. If the signal indication is "danger," the air-valve is not re-

closed by the said downward movement, and a long audible signal is given by the escaping train-line air while the automatic application of the brakes is being made.

A full illustrated description of this device, and its remarkable two years' record, was published in the *Railway Age Gazette* of April 13, 1917.

THE INTERNATIONAL SIGNAL COMPANY,
JEAN F. WEBB, PRESIDENT.

Manufacturing Specialties in Railroad Repair Shops

NEW YORK CITY.

TO THE EDITOR:

In my opinion your editorial on "Manufacturing Specialties in Railroad Shops" in the *Railway Age* of January 23, page 282, is based on strictly sound and common sense arguments. You could very well have gone a step further, however, and have discussed the question in its broader relationship to the labor situation at large. There is at present, and has been for some time, a big shortage of skilled labor—at least there is in effect a shortage. From such observations as I have been able to make in studying operations in industrial, and particularly in railway shops, I am under the distinct impression that this so-called shortage would be almost nil if every workman put forth his best efforts and gave an honest day's work for the present high wages that he is receiving. He would, in fact, be heavily rewarded for this extra effort for the increased production would tend to reduce the cost of living and his wages would have a greater purchasing value. Leaving this phase of the question aside, however, no one questions the fact that the present high cost of living is due to the shortage of labor and restricted production.

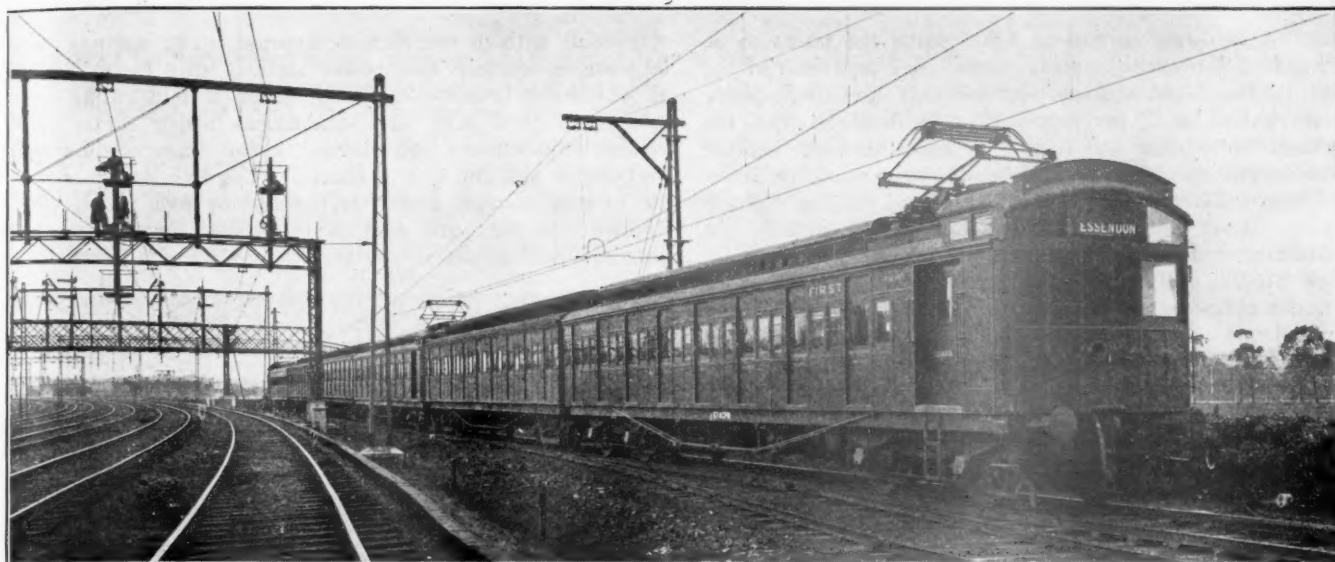
It is up to the railroads, therefore, to do their full part in conserving the present available supply of labor. Government control and war conditions have saddled the railroads with a lot of rules and regulations concerning wages and working conditions that will make it mighty hard to maintain the properties and equipment in a satisfactory condition when the roads are returned to their owners on March 1. Facing these conditions it seems like folly for any railroad shop to manufacture specialties which have been developed by and may be purchased from railway supply manufacturers. The manufacturers with highly specialized facilities, and comparatively small and highly supervised plants can produce the manufactured goods at a smaller cost and with less labor than a railroad shop which must of necessity, give prime attention to the repair and maintenance of equipment and which can only do the manufacturing work as a side line.

Railroad mechanical department officers without the treasury of the United States Government behind them will have their hands full making good on the job of maintaining equipment under private operation, without attempting to make a showing on paper by trying to invade the field of the railway supply manufacturers. These officers must also keep in mind the duty of the railroads in helping to conserve the labor supply.

This letter is intended simply to supplement your editorial and should be read in connection with it.

OBSERVER.

THE IOWA FARM BUREAU FEDERATION, at its annual meeting at Des Moines, on January 9, adopted resolutions opposing government ownership of public utilities, and demanding the return of the railroads to their owners under regulations assuring adequate service at just rates.



Train Consisting of Three Motor Cars and Three Trailers

Electrification of Melbourne Suburban Railways

Over 300 Miles of Line Involved—Design of Catenary Structure Includes Many Features of Merit

IT WAS as far back as 1896, sixteen years after the State took control of the railways in Victoria (Australia), and the State now owns all but 14 miles of track, that the question of electrifying the Victoria railway system was seriously considered, but it was not until 1912, after several investigations had been made, that any active steps towards electrification were taken. At that time it was decided to

an excellent cable tramway, and deal with a large amount of traffic which in other cities is dealt with by street railways, interurban railroads or motor omnibuses. The longest individual line extends 26 miles from the city.

In order to determine more accurately the most economical system of electrification to be adopted, alternative bids were obtained for the installation of the single-phase and

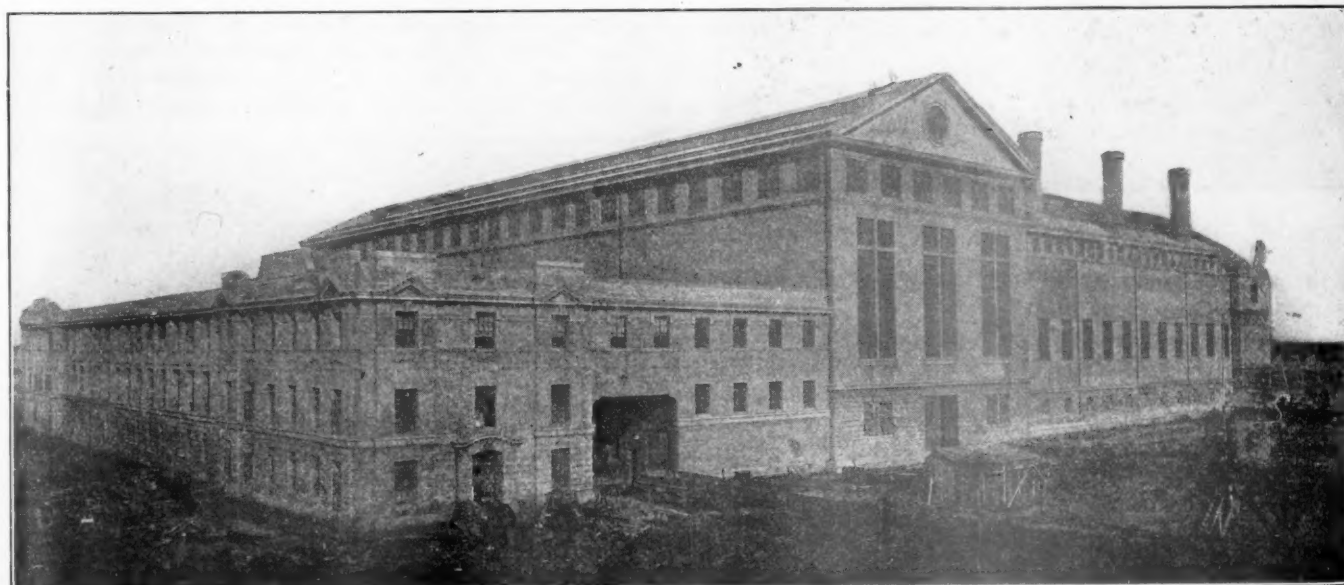


Fig. 1. The Power Station at Newport

electrify the lines in the Melbourne suburban area (Fig. 5) in accordance with the plans of Charles H. Merz, of Merz & McLellan, consulting engineers, of London. These plans involved the electrification of some 300 miles of line—the total mileage of the State railways in Victoria is about 4,300 miles—in the immediate vicinity of Melbourne. The suburban railways cover a large area, in spite of there being

direct-current systems. The single-phase system called for a plant to generate 3-phase current at 25 cycles which was to be distributed to the substations, and there split into single-phase current and supplied to the trains at 11,000 volts. The direct-current system called for a plant to generate 3-phase current at 25-cycles and 3,300 volts which was to be distributed to the substations at 20,000 volts and there

converted to direct current at 1,500 volts, the trains to be operated on the multiple unit system. A comparison of the cost* of these two systems showed that the single-phase system would be 23 per cent greater in first cost than the direct-current system and further, it was estimated that the cost of operation of the direct-current system would be about \$350,000 or 21.7 per cent less per year than the single-phase system. It was thus decided to adopt the d.c. system. It has been reported that the total cost of the work will be about \$16,000,000, which is some 2 or \$3,000,000 more than the estimate. On account of the war, the work has been delayed and the cost of materials has increased, and this accounts for the increase in the total cost over the estimate.

The railways being state owned, it is intended eventually to utilize the plant provided for the operation of the railways to develop a more extended use of electricity throughout the state. This would improve the load factor and thus make it possible to produce the power at a low rate. A scheme is already under consideration for the unification of the generation and distribution of electric power throughout the state. The increased cost of coal has, in all parts of the world, affected the situation in Australia. The cost of generating the power was based on a price of \$2.40 per ton,



Fig. 2. Interior View of the Turbine Room

but the cost has now risen to about \$4.40 per ton. While this increases the cost of the generation of power it does, to a greater extent, increase the cost of the operation of steam locomotives, and thus will show a larger profit from electrification.

Most of the work in electrifying the lines was done during the war. The main contracts were placed in March, 1913, and the work was started in November, 1913. The first electric train was run on May 29, 1919.

Power Station

It was decided to adopt a site for the power house (Fig. 1) at Newport, which, although it is not located at the geographical center of the electrified system, had certain advantages in connection with condensing water, sub-soil, etc., which compensated for the additional expenditure on transmission cables. The site adjoins the Williamstown Ferry and occupies 36 acres. The existence of a stone break-water enabled the intake and discharge of the condensing water to be separated in a manner which is not ordinarily

obtainable without considerable expense. The site has been laid out to contain two power stations side by side, one of which has been built. This station is laid out to contain six 10,000 k.w. turbo-alternators which suffices for present requirements and allows for two spare sets for the purpose of standby and overhaul. The two boiler houses are located at right angles to the turbine room, each with its own coal store and coal handling machinery. Between the two boiler houses is a space occupied by a general pur-

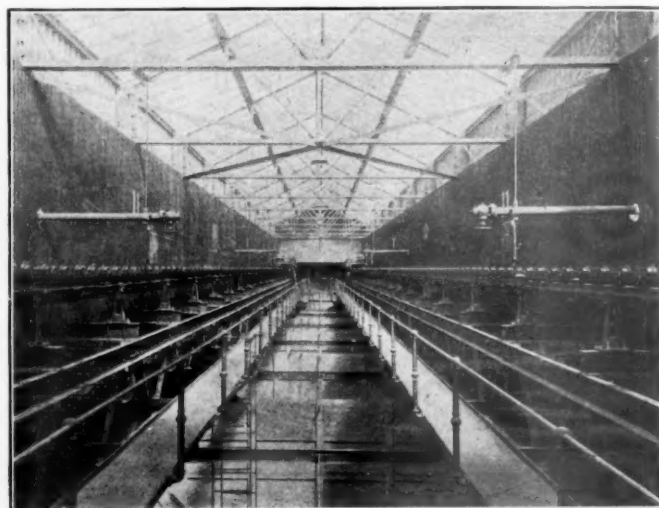


Fig. 3. Coal Hoppers and Conveying Belt

pose building containing stores, water storage tanks, workmen's accommodation, laboratories, test tanks, etc., a satisfactory arrangement from the architectural point of view and efficient as regards administration and working.

Power is developed by six turbo-generators (Fig. 2) of the Parson reaction type, operating at a steam pressure of 200-lb, with a superheat of about 200 deg. F. and a vacuum of 28 $\frac{3}{4}$ in, and at a speed of 1,500 r.p.m. These generators produce 3-phase current at 3,300 volts and 25 cycles which is stepped up to 20,000 volts for transmission to the sub-stations. The generators are ventilated by fans of the Siroc-

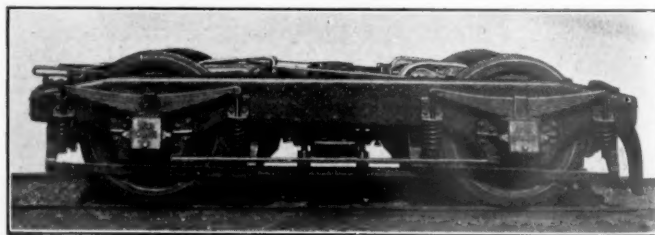


Fig. 4. Motor Truck for One of the Multiple Unit Cars

co type driven by 30 hp. Westinghouse induction motors. Each prime mover is treated as far as possible as an independent unit with a separate set of auxiliaries such as pumps, transformers, etc., for each unit. The turbine-room is provided with a 60-ton 75-ft. crane, having an auxiliary hoist capable of lifting 50 tons. Although experience seems to indicate that oil in transformers presents a negligible fire risk, it was thought wise to instal transformers belonging to each generator in a separate chamber outside the turbine room. The transformers are separated by intervening chambers containing air filters, neutral resistances, etc.

Condensing Plant

Condensing water is taken from the water front on one side of a retaining wall and returned to the river on the other side of this wall. Water passes from the river to a

*These figures, as well as a few others in this article, were taken from an article by C. T. Stephenson in the Industrial Australian and Mining Standard of August 28, 1919.

pit between the two boiler houses, from which it is picked up by the circulating water pumps, through a channel made into sections, each of which can be worked separately. The suction of the pumps are so arranged that four pumps can always draw from the one section of the channel should the other section be shut down for cleaning and repairs. The circulating pumps are located in a pit below the pump house basement so that they are flooded at all stages of the

are arranged in pairs, six on each side of the boiler room. The feed pumps are located in the pump house, the feed-water being taken from hot wells. The feed-water is supplied by the condensed steam from the turbines and is further heated by the exhaust steam from the feed pumps and auxiliary turbines. The losses in water are made up from the city mains.

Coal is received in 15-ton hopper cars and dumped into



Fig. 5. Map Showing the Location of Power Stations, Substations and Transmission Lines of the Melbourne Electrified Railways

tide. They are driven, through flexible couplings, by induction motors located on the turbine floor level.

Boiler Plant

The generators are provided with steam from 12 Babcock & Wilcox marine type water tube boilers having a normal evaporation of 30,000 lb. at 210 lb. boiler pressure. These boilers are provided with chain grate stokers, Green economizers, superheaters and Sirocco draught fans. The superheaters provide a superheat of 220 deg. F. The boilers

large hoppers below the track between the boiler house and the storage yard. It then passes to bucket conveyors which carry it over weigh bridges—weighing four buckets at one time—to the coal bunkers (Fig. 3) above the boilers or by a central conveyor to a coal storage yard. Motor driven crushers are provided below the hoppers in the track where the coal may be crushed when necessary. The coal carried by the central conveyor to the storage yard is automatically dumped where required, and in addition a grab bucket operated by an electric jib crane of the luffing type further

distributes the coal over the storage area. The coal from the storage yard is delivered back to the boiler house through an underground passage by a system of conveyors.

The ash handling apparatus is of the suction type, two sets being provided. The ashes are drawn into a receiver located above a track on which the ash cars are located and are subject to a fine stream of cooling water as they pass into the receiver. A few half-ton trucks running on narrow gage rails under the furnaces are provided for handling the ashes in case of emergency.

Switch House

One of the most interesting features of the installation is the switch house. This is parallel to the turbine room but about 120 ft. from it, there being no attempt to provide ready communication between the switch house and the engine room staff except by telephone and telegraph. A

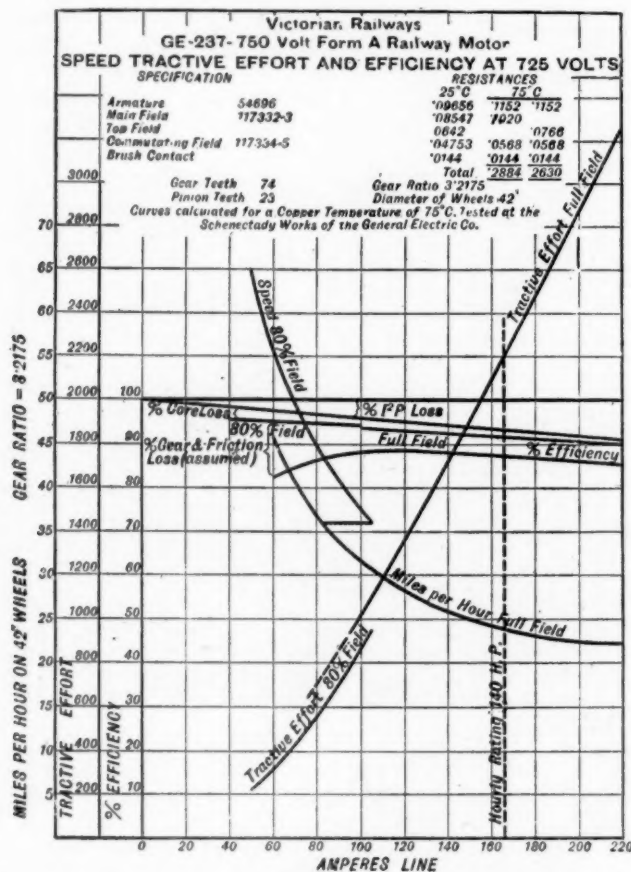


Fig. 6. Diagram of Traction Motor Characteristics

feature of the switch gear is the arrangement of the bus-bars. The power station bus-bars are divided into two sections by means of a section switch, each substation being fed from both sections. So far as security of supply is concerned, there, the arrangement may be regarded as equal to duplicate bus-bars without the complication and expense of the latter.

Each phase of the main switches has a separate single-pole switch in an oil tank, the parts working in air being isolated from the parts working in oil. Each single pole switch has multiple breaks arranged vertically close together in the middle of the tank in series, with insulating barriers between adjacent breaks, there being four breaks in the single-pole generator oil switches. These are so connected that upon the switch opening under load the mutual induction of the arcs produces a radial blow-out effect towards the insulated wall of the tank. Opening speeds up to an

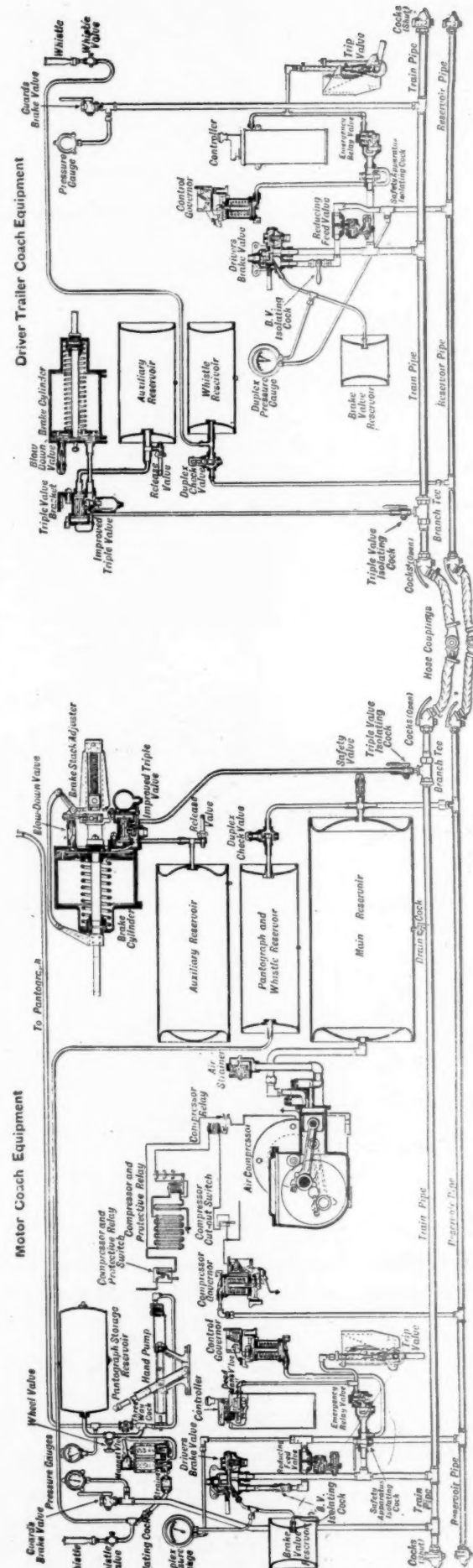


Fig. 7. Arrangement of Air Brake Apparatus for Multiple Unit Cars

equivalent of 50 ft. per second can be obtained, aluminum being employed to ensure rapid acceleration. The gases produced are discharged to the outer passage way.

The 3-phase oil switch will safely open a short circuit on a system controlling power of a rated capacity of 240,000 kilovoltamperes. The operating gear consists of a rotary type magnet actuating a countershaft through a toggle mechanism and tripping box, the magnet being excited from a 110-volt battery supply and contactor, operating from the control board.

In addition to red and green indicating lamps, there is an alarm bell device to give warning when the switch has opened. In spite of the heavy mechanical construction, the tripping mechanism is operated by a small $\frac{1}{2}$ -lb. solenoid with $1\frac{1}{2}$ -in. travel.

The generator equipments are fitted with Merz-Price protective gear, while feeder equipments have split conductor protective gear. Each generator has an emergency control pillar and load indicator fixed in the engine room.

The control room is situated at the end of the switch

included in the present scheme, 9 being of .15 sq. in. and four of 0.1 sq. in. cross sectional area. Paper insulated, lead covered, wire armoured cables are employed, all of the split conductor type. The cables are mainly laid in trenches in the streets owing to the very limited space available alongside the railway lines.

The trench averages 4 ft. in depth, and the cables are 1 ft. 9 in. between centers, covered by boards. Special precautions are taken in the cast iron joint boxes to prevent air pockets being formed when being filled with compound.

In the outlying districts the supply to the substations is provided by overhead transmission on the track equipment structures. The overhead transmission lines are carried on brackets extending from the sides of the masts away from the tracks, the three phases, each of the two separate wires of .035 sq. in. being placed directly above one another, and supported on chain type insulators. This enables the split conductor protection system to be used throughout the high tension transmission system. Telephone cables are laid

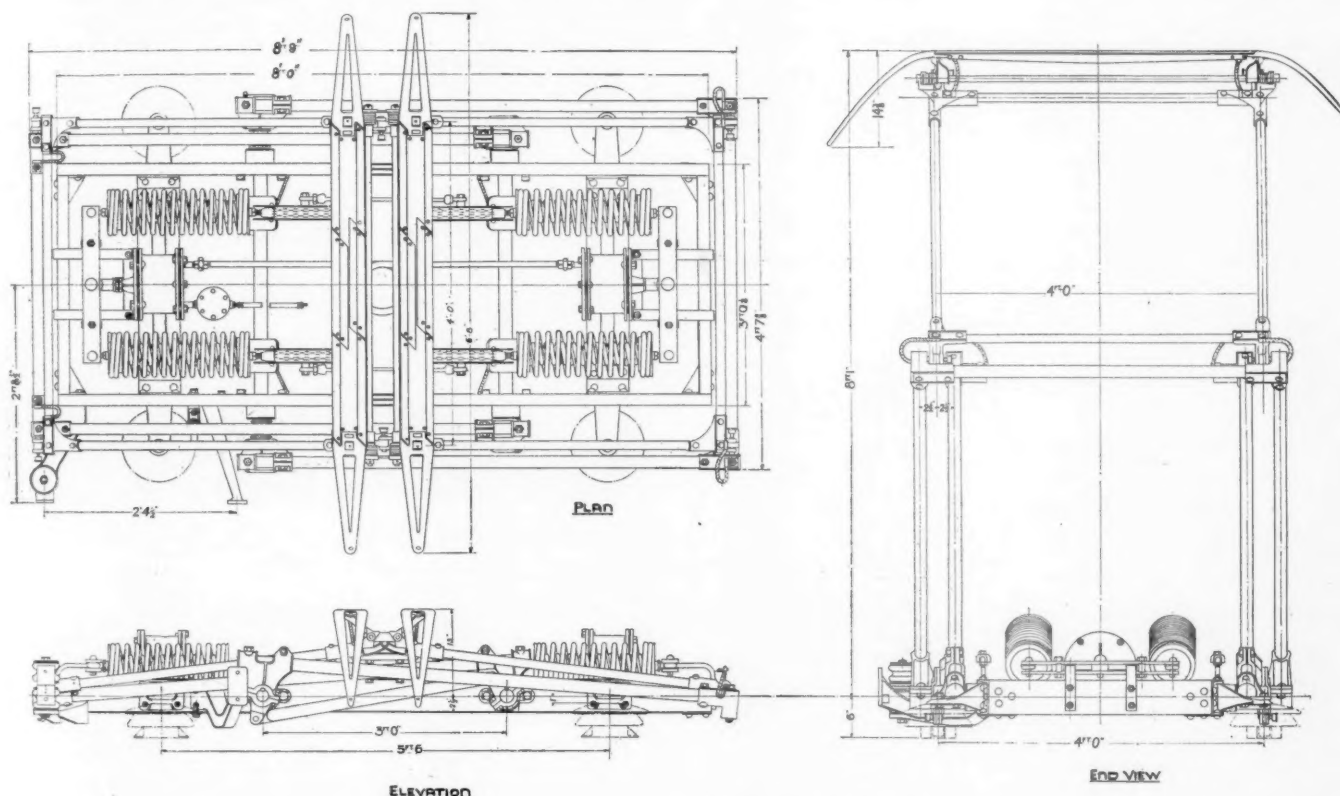


Fig. 8. Arrangement of Pantograph Collector

house. In it is centered not only the control of the main power station switches of the generators and transmission feeders, but all electrical operations throughout the entire transmission and conversion system are directed from this point. On the control engineer rests the responsibility of all electrical switching operations and his control is absolute. A gallery is provided for visitors, although there are very few signs of activity during operations. The most striking feature is a huge diagram covering one wall of the room showing the position of all switches and electrical apparatus. Facing it are control switchboards covered with instruments. In the center of the room is a table supporting automatic telephone instruments and the log book.

Distribution System

Thirteen 20,000-volt feeders radiating from the Newport power house to the substations in the central area are

along the route of the 20,000-volt transmission, there being an automatic telephone exchange at Jolimont substation for 50 lines. This provides communication between the control room, all substations, and certain important signal boxes from which switching of the overhead contact wires is regulated. Such 1,500-volt direct current feeders as are employed are paper insulated, lead covered, and for the most part wire armoured, being of .75 sq. in. and in a few cases 0.5 sq. in. sectional area.

Substations

Fifteen railway traction substations are being provided, and there are in addition two tramway substations, one at Elwood for supplying the St. Kilda-Brighton electric tramways, and the other at Sandringham for supplying the Sandringham-Blacksrock tramway. At Spencer street a substation is also being built to take over the supply of lighting

Rolling Stock

The trains are operated on the multiple unit system, every second or third car being equipped with motors. In the present case it was the intention to make up units of a motor car and trailer both equipped for driving from one end, but up to the present time only a limited number of trailer cars have been equipped with the driving apparatus. The normal six-car train has a motor car with its driving end outward at each end of the train with a third motor car about the center of the train. There are some 700 coaches in use on the electrified lines at the present time. These are made up of 359 motor coaches, 56 trailers equipped

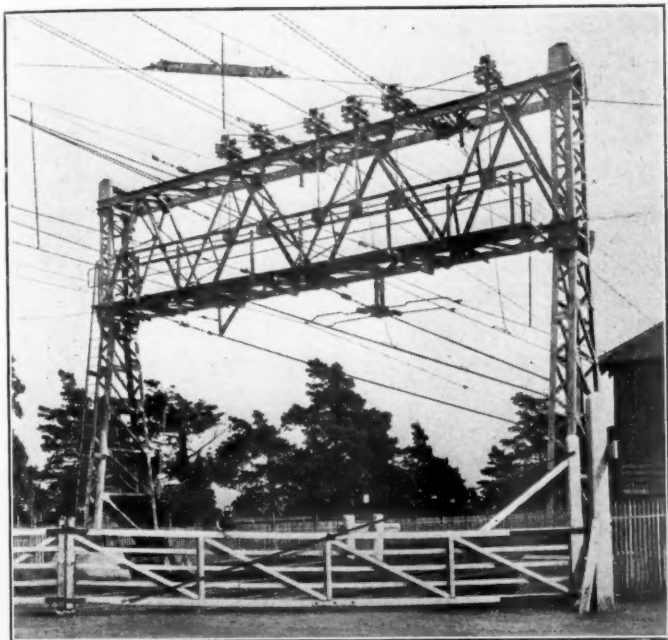


Fig. 11. Tensioning Structure for Smaller Spans

with driving apparatus on one and 287 trailers with no driving apparatus. No special type of car has been designed for use at Melbourne, the existing rolling stock being converted for electrified operation. All of these cars are equipped with side doors of either the swing or sliding type opening into compartments. Some of these cars have but two partitions, one of which is solid, preventing any communication between the compartments of that car. Each of these compartments have center aisles with two passenger seats on one side and three on the other. Doors, however, are provided at the entrance to each seat. There are no vestibules to these cars which makes it impossible to pass from one car to another.

The underframes of the motor coaches are made up of 10-in. by 3½-in. by 25.39-lb. channels for side and end sills with intermediate sills, cross bearers and diagonal braces of 6-in. by 3-in. by 14.5-lb. channels. The draw gear is anchored to a 10-in. by 3½-in. channel secured between the intermediate sills. The underframe is covered by ⅛-in. steel plate which, in addition to strengthening the structure, provides a fireproof protection between the underframe and the body. These underframes are 58¾ in. long by 9 ft. wide with 42 ft. truck centers.

The motor trucks (Fig. 4) are made up of ½-in. pressed steel side frames, the bearing springs being of the laminated type 4 ft. long and are fitted with double auxiliary spiral springs at each end. The bolsters are made up of two pressed steel plates 5-in. thick and are of the swing type. They are supported on four spiral springs at each end. The whole base of the truck is 8 ft. 6 in. The wheels are 42 in. in diameter and the journals are 9 in. by 5½ in.

The motor cars weigh 104,800 lb. and 107,150 lb., the heavier cars having a weight per passenger seat of 1,280 lb. for 84 passengers. The driving trailers weigh 58,850 lb. and 61,768 lb., the heavier car having a weight per passenger seat of 735 lb. for 84 passengers. The non-driving trailer cars weigh 36,950 lb. and 61,376 lb., the heavier of which having a weight per passenger seat of 653 lb. for 94 passengers.

These cars are equipped with Westinghouse air brakes, the clasp type of brake being used. Air is supplied by means of a two cylinder single acting electrically driven air compressor, one being supplied to each motor coach. A main reservoir pressure of 100 lb. is carried, and the compressor is automatically thrown into action when the pressure falls to 90 lb. A train line pressure of 80 lb. is carried. The brake cylinder is 16 in. in diameter and the braking force is equal to 110 per cent of the tare weight of the motor car with 60-lb pressure in the brake cylinders. The braking force on the trailers is, however, 100 per cent of the tare weight. The cars are also equipped with air signals.

Every driving car is fitted with a "pilot" or "deadman's" valve and a trip valve, which are connected to the top side of the emergency relay valve attached to the train pipe. The arrangement of the air brake apparatus is shown in Fig. 7.

The motor equipment consists of four G. E. No. 237 motors of 140 hp. with two motors connected permanently in series. The armatures are connected to the axles through single reduction gears. They are geared to give a maximum

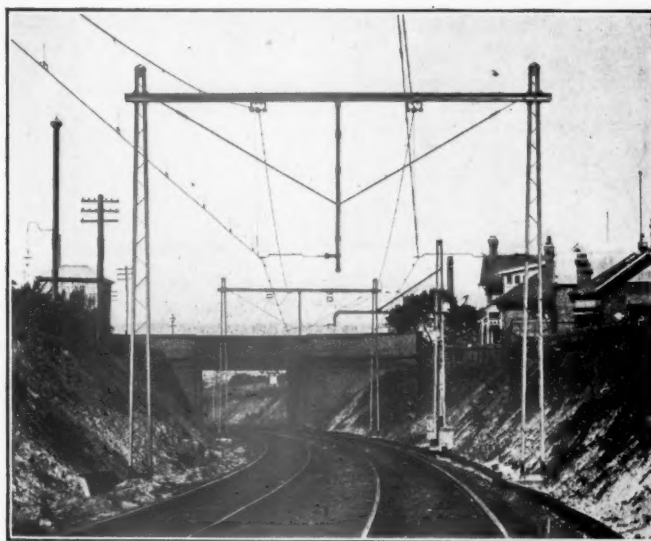


Fig. 12. Intermediate Supporting Structures on Curved Tracks

speed of 52 m.p.h. on level tangent track. The characteristic curves of these motors are shown in Fig. 6.

The arrangement of the pantograph is shown in Figs. 8 and 9. The total pressure of the pantograph on the contact wire is such that with a reasonably clean wire the pantograph is able to collect considerably over the 500 amperes, the normal maximum operating current for each motor coach, without sparking from a contact wire .25 sq. in. cross section. The pantograph has a working range between 14 ft. 6 in. and 21 ft. 6 in., extension being by means of springs worked by pistons in cylinders mounted on the frame of the collector. Air for operating the pistons is supplied from the pantograph and whistle reservoir in the first instance by a hand pump installed in the guard's compartment, air, however, being obtained from the main brake reservoir when the latter is charged. The pantograph is controlled by means of two

electro-pneumatic valves which can be operated electrically or by hand.

The master controller is of standard type, but as the actuation of the contactors is automatic the controller only has four points in the forward direction and two in the reverse direction, the first point in either direction being known as the "switching" or "lap point," and the second point being the "series" position.

Permanent Way and Overhead Equipment

The total mileage which has been electrified is approximately 335 track miles including sidings. Most of the lines are double track. There are, however, two miles of 3 track line, over 5 miles of four-track line, and over 3 miles of six-track line. The rails used are of T-section weighing 100-lb. per yard, being double spiked to untreated hardwood ties. These ties are 9 ft. by 10 in. by 5 in. and are spaced 2 ft. 10 in. apart between rail joints and 1 ft. 8 in. apart at the joints. The ballast is made up of bluestone and is about 15 in. deep. The gauge of the track is 5 ft. 3 in. spaced on 11 ft. 8 in. centers. The minimum structure clearance above platform level on tangent track is 7 ft. from the center of the track. This is increased to 8 ft. on 800-ft. curves. The smallest curve has a radius of 600 ft. All curves have a 150-ft. easement approach. The 9 miles between North Melbourne and Broad Meadows has an average grade of 85 per cent and the maximum permissible speed on this section is 52 m.p.h. The maximum grade of any importance is one of 2 per cent.

The 1500-volt direct current is transmitted to the motor

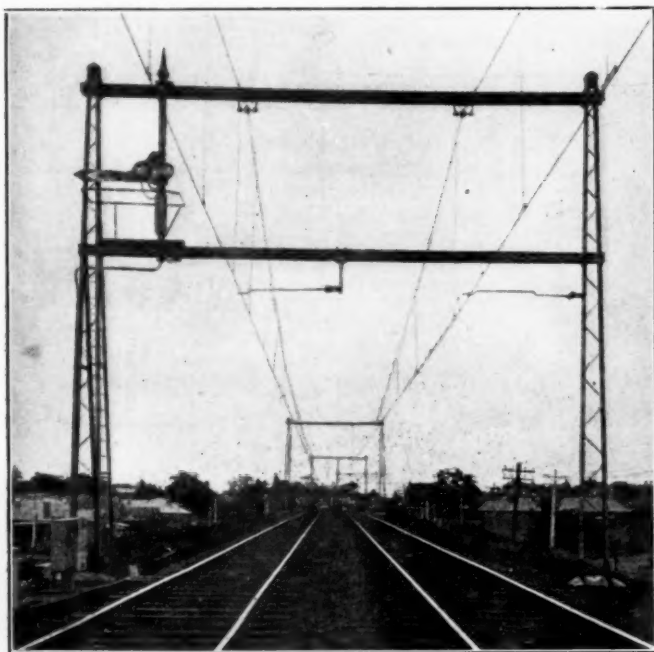


Fig. 13. Intermediate Supporting Structures Adapted for Carrying Signals

coaches through overhead contact wires arranged on the simple catenary system. The number of conductors was kept at a minimum to avoid interference with signals; only one catenary wire and one contact wire are used, there being no auxiliary feeder cables.

The supporting droppers between the catenary cable and contact wire have at the lower end a short length of chain, so that the tendency of the contact wires to lift under the upward pressure of passing pantographs is not restricted by the weight of the dropper or of the catenary cable to which it is attached. Automatic tensioning of the contact wire is provided for by a system of floating balance weights

at each end of tension sections, the relative movement of the contact wire and catenary cable being provided for by a horizontal sliding attachment to the droppers.

The normal construction on main suburban tracks is 0.25 sq. in. hard drawn grooved copper contact wire supported by flexible droppers at intervals of 15 ft. from a stranded hard drawn copper cable of .25 or .375 sq. in. There is thus an equivalent of 0.5 sq. in. of copper over each track, there being no feeders other than the supporting catenary wire. The contact wire is automatically tensioned at each end of a 3,000 ft. length of approximately 2,500 lb. The catenary wire normally has a 10 ft. 9 in. sag at the center of a 300-ft. span at 60 deg. F., with a maximum tension of approxi-

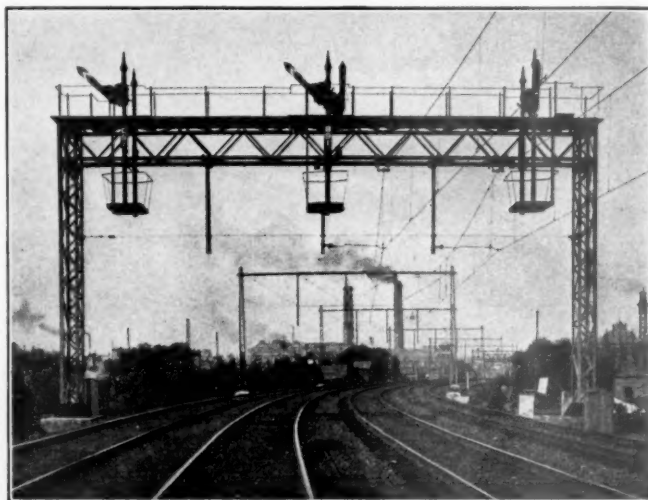


Fig. 14. Another Method of Carrying Signals on Intermediate Supporting Structures

mately 3,200 lb. and is anchored about every 3,000 ft.

The normal contact wire height is 16 ft. 6 in. over the main suburban tracks at 70 deg. F., but over grade crossings the minimum height is 18 ft., while under low bridges, which are numerous, the minimum height is 14 ft. 6 in. above rail level, giving a vertical clearance of 12 in. between the contact wire collecting surface and the underside of the bridge. As the maximum height of projecting ventilators on country rolling stock is 14 ft. 2 in., some considerable care had to be exercised to avoid trouble. It was finally decided to retain the flexible contact wire beneath low bridges.

To obtain satisfactory alignment, and to ensure that the pantograph with a normal upward pressure of between 25 and 30 lb. at a speed of 50 m.p.h. would not raise the contact wire more than two inches, a maximum grade of 1 in 150 was adopted, and where possible a grade of 1 in 250, except where speeds were limited. Where a steam service is also being used the insulators are arranged so as to avoid the direct blast of the locomotive exhaust. The importance of careful alignment will be realized as temperature limits between 27 deg. F. and 175 deg. F. had to be allowed for.

Supporting Structures.

The supports for the catenary construction consist of tensioning anchoring structures about 3,000 ft. apart with lighter intermediate structures at 300 ft. intervals on tangent track and closer at curves.

The tensioning structure extending over six tracks is shown in Fig. 10. This structure is made up of 8-in. channels with angle bracing, and the masts are made up of 6-in. by 6-in. by 1/2-in. angles with lighter angles for bracing. The masts are anchored to concrete foundations. Twelve contact wires are tensioned from the bottom member of the span. Chains attached to the contact wires pass over pul-

leys on the lower span member and carry weights located in the right hand mast. The catenary wires are rigidly anchored to the top member of the span. Tensioning structures for smaller spans are of similar construction but are made of lighter material (Fig. 11).

The intermediate supporting structures for curved tracks

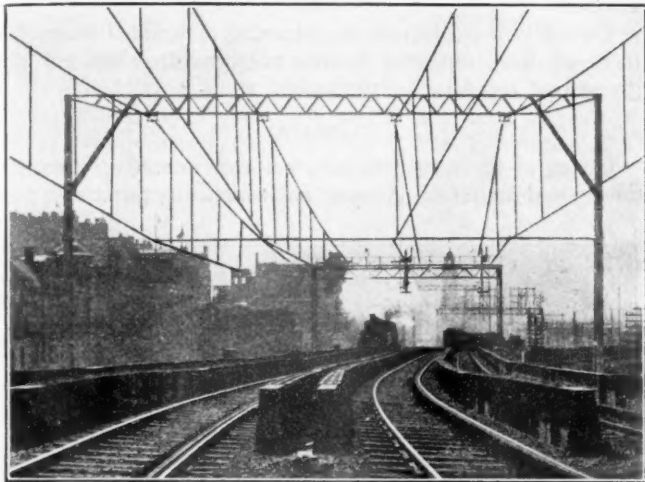


Fig. 15. Overhead Wire Supports Used at Bridges

are indicated in Fig. 12. The masts are made up of 7-in. channels and the span is made up of 6-in. latticed channels. A guiding arm extends down from the middle of the span made up of a two 4-in. channels for the purpose of guiding the contact wires. This arm is braced to the ends of the span by tie rods provided with turn-buckles.

The structures built for supporting the overhead wires serve also as a signal bridge in certain cases, and Fig. 13

and has a 120-ft. span. At this point there are a number of crossings which complicate the overhead wiring. The span of this structure is made up of four main cords of a pair of 4-in. by 4-in. by $\frac{1}{2}$ -in. angles with 3-in. by 3-in. by $\frac{1}{2}$ -in. and smaller angles used for bracing. The design of the bridge is such that with the legs fixed the expansion and contraction is permitted by a rising and lowering of the span. The overhead construction used in the yards is shown in Fig. 17.

All overhead equipment structures, signalling bridges and overline road bridges to which line work is attached are bonded to the track rails through a paper spark gap, .001 thick, between two aluminum discs. By this means the structures are normally insulated from the rails, and the liability of unbalancing of traction return current in the

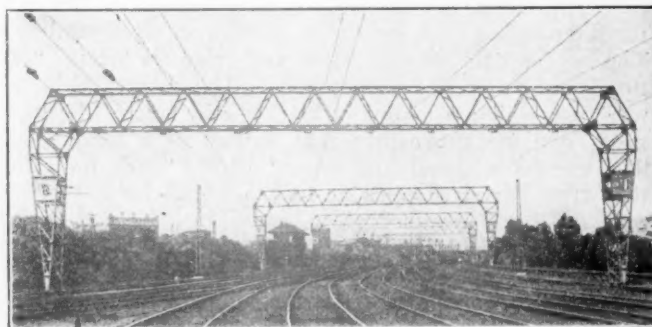


Fig. 16. Supporting Structures for Contact Wires at Terminals

running rails due to leakage of current through imperfectly insulated structures is reduced to a minimum. This precaution is taken as it is necessary to limit the unbalancing of current through the impedance bonds connecting the sig-

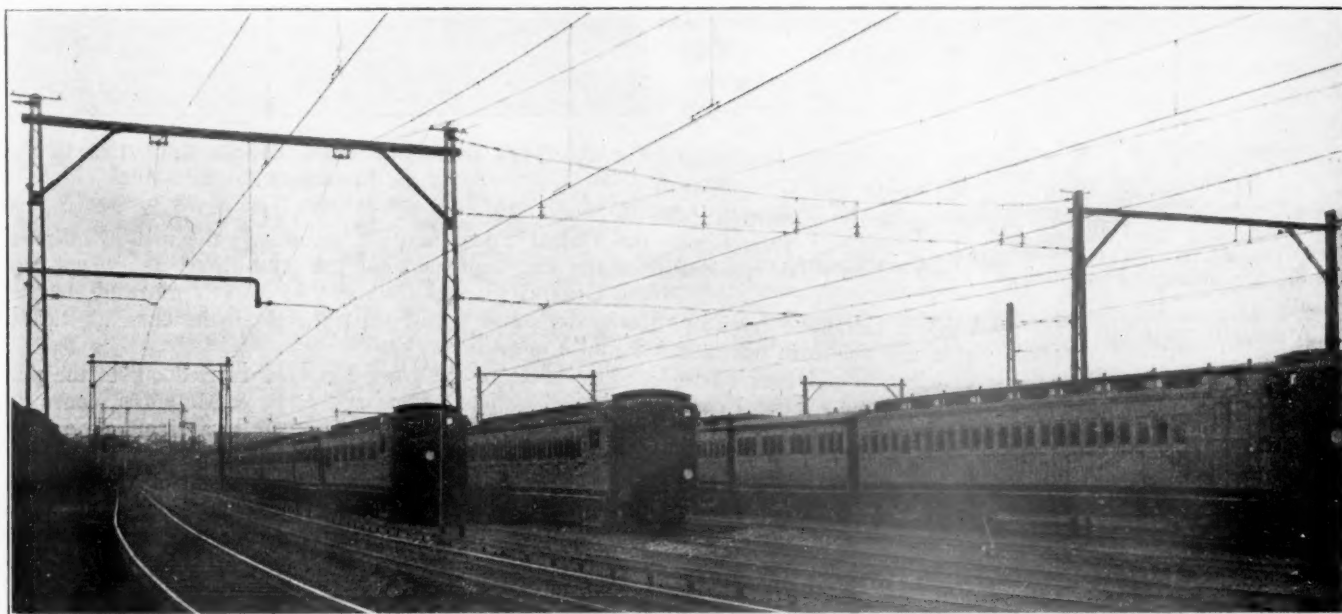


Fig. 17. Method of Supporting Contact Wires Over Yards

and Fig. 14 shows the adaptation of an intermediate supporting structure for this purpose.

Fig. 15 shows the construction of intermediate overhead wire supports at bridges or viaducts and indicates in addition another method of guiding the contact wire on curves.

An example of supporting structures for the contact wires over a large number of tracks is shown in Fig. 16. This is a pin arch structure located at North Melbourne junction

nalling track circuits which are operated by alternating current. Should the insulation between the overhead wires and supporting structures break down the spark gap punctures and the structure is connected to the nearest rail, thus giving a comparatively low resistance return to the substation.

The up and down tracks of all routes are electrically insulated from each other, and all routes are as far as possible separately fed. At extensive junctions the overhead

wires of a number of tracks are connected together and treated as one section, and are usually sectioned at both ends. An air section insulation is employed between track sections where the speed of trains exceeds 25 m.p.h. Over crossovers and leading-in tracks to sidings where train speed is restricted the tracks are electrically insulated from each other by means of section insulators in the catenary and contact wires. Ordinary terminal strain insulators are employed in the catenary wire and continuous feed section insulators in the contact wire.

Sectioning points are located with reference to traffic requirements and the position of crossovers, being on the outlying lines from 2 to 3 miles apart.

Signal System*

Automatic signaling of the upper quadrant, three position type, which is extensively used in the United States, is used throughout the electrified portion of these railways. The light signals are red, yellow and green for "stop," "caution" and "proceed," respectively. The marker light, always red, which is located on the opposite side of the signal mast from the automatic signal is used as a fixed signal. The automatic signal arm has a pointed blade indicating that after having stopped at such a signal for a specified time, the driver is authorized to proceed into the next section.

The interlocked signal is a two-arm signal, the top arm being called the normal speed arm and the lower arm the low speed arm. On the Victorian railways this arm limits the speed to 25 m.p.h. Each arm works in the three positions as in the case of the one arm automatic signal. The interlocking signals have square ends which denotes an absolute stop. There is placed below these two signal arms and on the same side as the signal mast, a hooded electric lamp with a yellow lens known as the low speed signal, which indicates that a speed of 10 m.p.h must not be exceeded.

Dwarf signals similar to those used on the Chicago & North Western are provided in yards for switching movements. In this case the "stop" indication at night is represented by a purple colored lense instead of red.

Track circuits are operated with alternating current at 6 volts. Signal mechanisms are operated by induction motors at 110 volts, and the signals are lighted by 6-volt $\frac{1}{2}$ -candle power lamps.

A few signals have been installed which give indications by colored lights for both day and night service. These consist of electric lamps of higher candle power with different colored lenses, namely, red, yellow and green, the whole arrangement being heavily hooded as a shield against daylight.

Automatic train stops are used in the electrified territory as shown in Fig. 18, consisting of a movable arm operated by an electric motor. There is a detection rod coupled to the end of the train stop arm which actuates electrical contacts in the circuit of the signal so that if anything should happen to this arm the signal would be set at "danger."

The switching points are unlocked, switched and relocked by a single stroke on one lever instead of using separate levers for the locking and switching movements. A sensitive electric detector is fitted to the arrangement so that a very small movement of either the switch or lock will cause the signal light over the switch to show the "danger" indication.

Wherever possible twin paper insulated lead sheathed cables are used to carry the wire. Where it is not possible to use this, Kerite insulated wire has been used.

The power for the signalling system is taken from the Newport Power station and transmitted to the substations at 20,000 volts. From this point it is delivered to the signal power transmission mains at 2,200 volts and stepped down to 110 volts for signal operation and 6 volts for track circuits.

Illuminated diagrams showing track arrangements are provided in the signal cabins.

The three-position signal and automatic train stop, mechanical impedance bonds, alternating current relays, time release mechanisms and the Kerite insulated wire were imported from America. The high tension switching gear, main transformers and lead cables were obtained from Great Britain.

Owing to the difficulty in obtaining material, the development of this improved system of signalling has not progressed as rapidly as anticipated.

General

Owing to the war, difficulty was experienced in obtaining the desired material. Among that which was purchased from

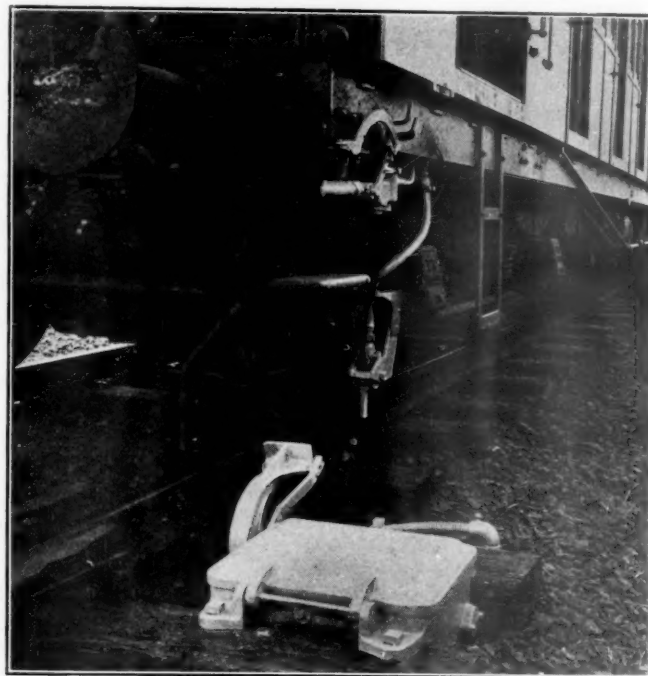


Fig. 18. Type of Automatic Stop Mechanism Which Is Used on the Electrified System

the United States may be mentioned the motor equipment for the cars and some of the substations equipment from the General Electric Company of New York, and electrical train stops and signal apparatus from the General Railway Signal Company.

The whole of the work has been carried out to the plans and specifications of Messrs. Merz & McLellan, consulting engineers, of London, through their local Melbourne representative, E. P. Grove, in conjunction with the Electrification Committee of the Railway Department of Victoria. The scheme owes much of its success to the energy and ability of the late E. B. Jones, for some time one of the Commissioners.

THE WESTERN SOCIETY OF CIVIL ENGINEERS, Chicago, held its annual dinner at the Morrison Hotel in that city on Wednesday evening, January 28. Retiring president Baldwin, vice-president of the Illinois Central Railroad Company, presided. Major-General Leonard Wood was the principal speaker of the evening. The officers elected for the ensuing year include: president, F. K. Coapland, president Sullivan Machinery Company, Chicago, and first vice-president, C. F. W. Felt, chief engineer, Atchison, Topeka & Santa Fe System. The plans for the ensuing year include the creation of a railroad section.

*Abstracted from an article by F. M. Calcutt, published in the August 28, 1919 issue of the *Industrial and Mining Standard*.

Director General Hines Answers Criticisms

In Letter to Newspaper Editors He Analyzes the Principal Points of Complaint Against Federal Control

WASHINGTON, D. C.

WALKER D. HINES, director general of railroads, has addressed to the editors of each of the newspapers of the country a letter analyzing the principal features of federal control of the railroads which have been the subject of public discussion. He says that it is not written to promote any particular solution of the railroad problem but merely represents a sincere effort to bring about a clear understanding, because he feels that "whatever the principle on which the railroad problem is to be solved, the public interest will be promoted by a correct appreciation of the real significance of the matter I discuss." The letter follows:

The railroad problem is so complex and so important that it deserves honest-minded analysis; and this not because the plan of any one group of advocates should be supported but because the best solution, upon whatever principle it proceeds, will be promoted by clearness of understanding of the facts. I therefore bespeak your careful consideration of the following effort to analyze the principal features of federal control which are now so much under discussion:

1. The alleged excessive costs of railroad operation by the Railroad Administration.—The confused notion finds support that while the increased operating cost in private enterprise is due to war conditions, a corresponding increase in railroad operating cost is due to mistakes of the Railroad Administration. Such an argument assumes that the railroads should have been, and in the future can be made to be, independent of economic conditions which have affected and will affect every other industrial enterprise. The public will deceive itself to its own injury if it is led to rely upon this fallacy.

Simply as an illustration, reference will be made to the largest private enterprise in the country. Moody's Manual for 1919 shows that the operating costs of the United States Steel Corporation increased from \$494,800,000 in 1914 to \$1,240,800,000* in 1918 (the figures for 1919 not yet being available), this being an increase of \$746,000,000. That is, the expenses of the Steel Corporation in 1918 were 151 per cent more than its expenses in 1914. The public naturally assumes until the contrary is shown that this increase was the normal result of enlarged production and necessary increases in prices and wages due to war conditions.

The operating costs of the railroads for 1919 can now be closely approximated and therefore will be used for comparison because they are larger than for 1918. The operating costs for the Class I railroads were \$2,140,000,000 for 1914 and were approximately \$4,324,000,000 for 1919, being an increase of \$2,184,000,000. In other words, the operating costs in 1919 were 102 per cent more than the operating costs in 1914. But many people are disposed to assume until the contrary is proved that this increase in railroad operating costs is due to mistakes of the Railroad Administration and not to enlarged production of transportation or to necessary increases in prices and wages.

We find that the Steel Corporation's tonnage of finished products increased about 55 per cent in 1918 over 1914, with the result that its increase in its cost per ton of finished product in 1918 was 61 per cent as compared with 1914. The increased service of the railroads in 1919 will be not less than 26 per cent in excess of the service in 1914, so that this would indicate an increased cost per unit of service on

the railroads of not more than 60 per cent in 1919 as compared with 1914.

In thus endeavoring to illustrate the all-pervasive increase in costs by this comparison between the principal steel enterprise and the railroad enterprise, the selection of the steel operations in 1918 for comparison with the railroad operations in 1919 is believed to be clearly less favorable to the Railroad Administration than the comparison would be if the 1919 figures of steel operation were now available. This is true because private industry, as well as the railroad industry, was subjected in 1919 to unfavorable conditions not prevailing in 1918, such as a slump in business in the first half of the year, interferences with the volume of business later in the year on account of strikes, the more complete effect of increased prices and wages, and the general relaxation in effort, which in 1919 has characterized all industry as compared with 1918. These additional difficulties are all reflected in the railroad operations for 1919.

Of course, no exact parallel can be claimed between any two radically different enterprises, and yet every fair-minded person must appreciate that until the contrary is shown the same presumptions of necessity for increased cost should obtain in considering railroad operating costs as in considering the operating costs of great private enterprises. Certainly the public can not afford to fool itself by thinking that the railroads can be operated in a state of isolation from all those influences which have affected every other line of human activity, public and private, in this country and in other parts of the world as the result of the greatest economic and social upheaval that the world has ever known.

It would be surprising if complete analysis did not indicate a more successful adjustment to the new conditions arising out of the war by the Steel Corporation with its unbroken continuity of management and policy extending over a period of nearly 20 years, and its ability to plan with confidence for the future, than by the United States Railroad Administration. It must be remembered that the Railroad Administration was created almost over night as a war emergency and avowedly as a purely temporary expedient; that it was consequently unable to create a really permanent organization or to hold throughout even its temporary life some of its most experienced members, and was without opportunity to carry out comprehensive policies of a reasonably permanent character either as to capital expenditures for new equipment and improvements or as to operation in respect of establishing permanent and more effective relationships between the management and the employees, and in other respects. Considering the exceptional difficulties thus confronting the Railroad Administration, it is noteworthy that despite the all-pervasive influences of war conditions the increase in operating costs has been kept as low as it has been. It should also be appreciated that to an important extent the showing is relatively so favorable because of the very substantial savings which have been practical under unified operation notwithstanding its being hampered so seriously by the shortness and uncertainty of its duration.

Public discussion always assumes, except when railroad operation is under consideration, that on account of the conditions growing out of the war the purchasing power of money is greatly decreased, so that it requires perhaps from \$1.80 to \$2 to buy as much materials and labor as \$1 would have

*In showing this figure for operating costs for 1918 there has been excluded the amount of federal income, war profits, and excess-profits taxes shown by the Steel Corporation's annual report to its stockholders.

bought in 1914. Thought on this point should be clarified so that it will be generally appreciated that the dollar to be expended by the railroads for their operating costs can not be expected to go any further on the average than the dollar expended by anybody else.

While so frequently ignored in discussion, yet there can not be serious denial that in the purchase of materials and supplies such as steel and iron, lumber, crossties, coal, etc., the railroads must pay the very heavy increases in prices which are paid by others similarly situated. These increases of themselves account for much of the increased expenses, although, of course, as in other industrial enterprises, the cost of labor is the largest element, and this will be separately referred to.

2. The alleged extravagant increases in wages of railroad labor.—Employees who work for the railroads are confronted with the increased cost of living just like other people, and increased wages for railroad employees have been not only necessary, but just. Contrary to the popular impression, the increases to railroad labor have not been out of line with increases to labor generally. Referring again, purely for the purpose of suggestive illustration, to the United States Steel Corporation, the head of that corporation stated last spring as to the average of all its steel products that the direct labor cost per ton in March, 1919, was \$34.61, as compared with \$15.13 in 1913, an increase of 119 per cent. The Department of Labor in its monthly labor review for November, 1919, shows that the pay per hour to labor in the iron and steel industry increased on the average 121 per cent in 1919 as compared with 1913. The average increase in the rate per hour for all railroad employees for the year 1919 as compared with the year 1913 will not exceed 100 per cent, and such average increase at the end of 1919 with all readjustments then in effect will not exceed 106 per cent.

When the Wage Commission, of which Hon. Franklin K. Lane was chairman, reported in the spring of 1916 on the wages of railroad employees, it pointed out that contrary to common conception railroad employees were not highly paid, that 51 per cent received during 1917 \$75 per month or less, and 80 per cent received \$100 per month or less. The leading executives of the eastern railroads, when they appeared before the Interstate Commerce Commission in the fall of 1917, laid stress upon the fact that their earnings were not sufficient to enable them to pay adequate wages in competition with other industries.

In making the important increases which were as indispensable for the railroads as in other enterprises, and which were long overdue in the case of the railroads, the government could not escape the policy of reasonably uniform treatment and the result of this policy operated to produce numerous individual cases of abnormally large wage increases, but the matter, from the standpoint of its total cost to the railroads and the public, must be considered as a whole, and the average increase per hour to railroad employees as a whole has been no more than was responsive to the conditions which have forced heavy increases upon all industrial enterprises and has not been out of line with what other enterprises have done.

If this subject is viewed in the light of the facts, the conclusion can only be the pay per hour to railroad employees on the average makes a reasonable comparison with what has been done in private enterprises.

3. The alleged excessive increase in the number of railroad employees under federal control.—The increase in the number of employees has been due principally to the adoption of the eight-hour day. Prior to federal control many classes of employees worked 10 hours per day and in some instances even longer, although the adoption of the eight-hour day had already made substantial progress on the railroads.

There have been many comments on the fact that in July, 1919, there was an increase of 11.2 per cent in the number of employees over the month of December, 1917. Since July, 1919, was a month favorable to much outside work calling for additional employees and December, 1917, on account of the severe weather, was a month unfavorable to outside work and besides there was at that time an admitted scarcity of railroad employees on account of competition of munitions plants, etc., and the other war demands, a more reliable comparison of the difference between the number of employees under private control and under federal control is the comparison of the entire year 1917 with the entire year 1919. On the latter basis there was an increase of 9.7 per cent in the number of employees for the year 1919, and yet the actual number of hours of work paid for was 5.9 per cent less in 1919 than in 1917. This is explained by the fact that during the year 1917 the employees worked on an average 261.4 hours per month, while during the year 1919 the employees worked on an average 218.5 hours per month (but it must be remembered that they were paid only for the hours worked, although, of course, at an increased rate per hour).

People who believe it is good public policy to require employees in the railroad industry to work on an average throughout the year 261.4 hours per month can, of course, make an issue with the Railroad Administration as to the propriety of the policy of the eight-hour day which has resulted during the year 1919 in reducing the average number of hours worked per month to 218.5, but in the interest of an intelligent understanding of the matter, the issue ought to be clearly made upon this broad question of policy. The matter ought not to be confused by some vague assumption that this increase in the number of employees is due to some insidious influence of the Railroad Administration in the interest of inefficiency.

It is also highly important to make clear that this increase in the number of employees on account of the eight-hour day does not involve in general an increase in the payroll, because generally the pay is based not upon the number of employees but upon the number of hours worked. The rate of increase in pay per hour above referred to completely reflects the increased wage, yet the tendency to confusion on these matters is so marked that frequently the total increase in wages is referred to, and in addition the increase in the number of employees is mentioned on the erroneous assumption that that constitutes a corresponding further increase in operating cost.

Surely the public is entitled to be set right upon this proposition. It should not be led to think that the mere substitution of private control for the temporary federal control will bring about the decrease in the number of employees to the pre-war basis. Such a decrease will not come in any general sense except through a return to the longer working day which obtained in 1917. Prior to federal control the train and engine men had the basic eight-hour day by virtue of the Adamson act, but on the average all other classes of railroad employees had a working day substantially in excess of eight hours, though the eight-hour day had been adopted on some railroads as to some classes of employees.

A further, but relatively minor, element working in favor of an increase in the number of employees is one which has been experienced by the railroads in common with all other forms of industrial enterprise. This grew out of the loss of experienced employees both during the war and since, the extraordinary movement of employees from one employer to another resulting in an exceptional labor turnover, and a widespread psychological unrest which seems to characterize every class of our citizens and which results in many employees being less attentive to their work. Similar causes have manifested themselves in enterprises generally. Certainly those who think both fairly and clearly cannot in the

same breath excuse this condition as unavoidable in private enterprises and charge it to the weakness of federal control in the case of the railroads.

There is a predisposition to assume that any governmental activity is actuated by a purpose to increase the number of employees, and from this premise, which is entirely mistaken as to the Railroad Administration, many erroneously attribute the increase in the number of railroad employees to some political preference for a larger rather than a smaller number of employees. The Railroad Administration has never had any such purpose. On the contrary, the local railroad officers are expected to control this matter to the fullest practicable extent, and the Central Administration is constantly investigating local conditions and using its authority as well as its influence to stimulate local managements to avoid all unnecessary employment. These local managements are the same skilled railroad officers who operated the railroads prior to federal control, and who will still continue to operate them after federal control is ended. There has not been at any time any element of politics in the selection of either officers or employees by the Railroad Administration either in the central or regional offices or on the various railroads.

4. The deficit from railroad operations.—This to a greater extent than anything else calls for clear and honest analysis. A deficit is due either to costs being too high or to revenues being too low. Fair-minded investigation will show, as is above explained, that the increases in cost have been in line with the unavoidable conditions which have controlled railroads as well as private enterprise. Of course, no industry so extensive as the railroad industry could be free from numerous incidents admitting of criticism, but, broadly speaking, the increase in costs has been fairly related to the changed conditions growing out of the war. This being true, the real explanation of the deficit is that the rate increase of 1918 could not be made effective soon enough and that perhaps railroad rates were not increased quite enough to pay all of the necessary increases in cost during the period of the war and readjustment.

To begin with, it was not practicable for the Railroad Administration to initiate any general increase in rates and put it into effect until June 10, 1918, as to passenger rates, and until June 25, 1918, as to freight rates. Thus, nearly six months of heavily increased costs had passed before these increased rates could be made effective. If these increases could have been made effective at the very beginning of federal control *there would have been no deficit whatever from railroad operations up to and including the end of October, 1919.* The entire deficit on the Class I railroads for that period of 22 months of federal control of \$480,200,000 would have been more than wiped out if the rate increases had been effective January 1, 1918.

The results for November and December, 1919 will be useless for the purpose of estimating normal earning capacity because of the extraordinary interference with business and increase of operating burdens growing out of the unprecedented coal strike, which so seriously interrupted and dislocated railroad traffic throughout the country. Large deficits for these two months prove nothing except the destructiveness of the coal strike.

The normal expenses of operation have been higher in 1919 than in 1918 because of still greater costs of materials and supplies and because of various readjustments in wages which were not completed in 1918. It may be that on these accounts, even under federal control, a small additional increase in rates would be necessary to make the railroads self-sustaining, but the Railroad Administration has felt that conditions were too abnormal and were changing too rapidly to make a satisfactory basis for the determination of what this additional increase ought to be. This abnormal character was due largely to the remarkable slump in freight

business following the armistice and lasting throughout the first six months of the year, and has been further accentuated by the unprecedented conditions of the coal strike in November and December.

The rate structures of the country are so complex that unnecessarily frequent changes therein are exceedingly disturbing to business interests. The general increase made in 1918 was carefully planned to avoid such difficulties as far as possible, and it is believed it involved less difficulties than any other plan which could have been then devised, but, nevertheless, the readjustments which were called for by business interests, so as to avoid interference with established relationships, have for nearly a year and half occupied most of the time of 33 freight traffic committees located throughout the country and made up of representatives of the shippers and the carriers and have called for over 20,000 changes in the rates put into effect by the general rate increase. It has been the judgment of the Railroad Administration that for the sole purpose of providing revenues for the government during federal control the making of a further general modification of such complicated and delicately inter-related rate structures should not be entered upon without an adequate understanding as to the amount of revenue which it would be necessary to raise and that the conditions during 1919 have been too abnormal to admit of drawing a correct conclusion, although the strong indications are that under a continuance of unified control a large general increase could probably be avoided altogether. Of course, with a return to private control consideration immediately thereafter of rates to sustain the credit of the railroad companies is inevitable.

The deficit, therefore, is really due to this conservatism of the administration in deferring a rate increase until it could be reasonably sure as to the basis upon which it ought to be computed. The result has been simply that for the time being the deficit in railroad operations has been made good through general taxation of the public instead of through the special taxation arising from an increase in rates.

There is a popular catch-phrase argument to the effect that two years of government control of the railroads have cost the country several hundred million dollars. The fact is that government control has cost the amount of operating expenses during federal control plus the rental, and, as above shown, these operating expenses do not in the aggregate reflect more than the perfectly normal influence of the extraordinary conditions which have told on railroad operation as well as on other enterprises. By reason of the impossibility of anticipating with precision the amount of the increased operating cost, and by reason of the earnest desire to avoid unnecessary disturbances of the complicated rates structure, a part of the added cost has not been made good by rate increases, and therefore has had to be made good by general taxation. But the cost is the same in either event, is paid for by the public in either event, and is due to war conditions. The cost which has been placed upon the public by private enterprises which have increased their prices enough not only to anticipate and cover their war operating costs, but also to produce unprecedented profits, has been immensely greater than any cost placed upon the public by the federal control of the railroads. The entire average increase in freight and passenger rates from 1914 to 1919, taking the country as a whole, has not exceeded 33 per cent, while the increases in the prices which the public has paid for the products of private enterprise in that time has been from 60 per cent to 150 per cent and higher.

Those who think there should have been under federal control general increases in rates as often as necessary to take care immediately of the entire expense of railroad operation so that no part of it would be taken care of even temporarily

through general taxation are, of course, entitled to criticise the policy of the Railroad Administration, but here again the issue should be clear-cut and should not be confused.

It would be most unfortunate if the public is misled into believing that the deficit is due to federal control and is to be cured by the termination of federal control, only to find that what will really cure the deficit will be an important increase in rates. Such an increase would equally cure the deficit under federal control, and in fact it is likely that a substantially less increase would be necessary because the full saving from unification could be preserved under federal control, and further, because under private control a wider margin of earnings will presumably be necessary to support the separate credit of the respective individual companies operating independently.

5. The railroad service.—Clear thinking requires consideration of the plant with which the government has had to perform the service. At the beginning of federal control it was conceded that for several years on account of high prices, difficulties as to railroad credit and general uncertainty as to the future, insufficient new equipment had been obtained. During the first year of federal control the amount of new equipment obtainable was limited absolutely by the amount of material which could be taken from other war purposes and devoted to the construction of railroad equipment. It was, therefore, impossible to construct any passenger, mail or express cars, or any refrigerator cars, stock cars, or flat cars, but the Railroad Administration was able to obtain the material necessary to construct 100,000 freight cars of other types.

During the second year of federal control, although more material was available, it was not practicable to construct additional equipment because of the near approach of the termination of federal control and the clearly expressed opposition of Congress to the idea of a further development of railroad facilities through the use of government funds by the Railroad Administration. In January and February, 1919, the Railroad Administration advised a definite extension of federal control, urging that in that way comprehensive plans could be put into effect for increasing railroad equipment and facilities to the extent called for by the prospective business of the country. This view was not acceptable to Congress, and there has been no basis for providing additional equipment. Accordingly, the Railroad Administration has had to operate with an amount of equipment that was insufficient.

At the same time there has been an extraordinary volume of business. From January 1, 1918, to November 1, 1919, there were over 13,000,000 soldiers, sailors and marines moved on the railroads, this being the equivalent of nearly 6,000,000,000 passenger miles, necessitating the use of 215,000 railroad coaches and Pullman cars and the movement of over 18,000 special trains. At the same time the movement of the civilian population reached proportions in excess of anything ever before experienced. The result was that the volume of passenger travel in the year 1918 was 8.1 per cent more than 1917, and the volume of passenger travel in 1919, up to October 31, was about 20 per cent more than in the corresponding period of 1917. Civilian inconveniences incident to this extraordinary passenger travel, which had to be handled without increase in passenger equipment, were inevitable.

The freight traffic for 1918 was in excess of that for 1917, which up to that time had been the heaviest year. During the first eight months of 1919 the freight traffic was considerably less than in either 1918 or 1917 on account of the great slump in business. But in the months of September and October, 1919, the traffic was greatly in excess of 1917, and for a part of the time in excess of that in 1918, notwithstanding the fact that the Railroad Administration was

unable in 1919 to secure the heavy car loading which as a measure of patriotism had been obtainable in 1918.

Therefore, despite all criticism of the service, the Railroad Administration, with an inadequate plant, has actually performed an exceptional volume of service, and it has done this with less congestion than was ever known in previous periods of heavy business in recent years. Even at present, in the face of extremely difficult weather and the adverse effect of the influenza on railroad labor, a heavy volume of traffic is being moved. Of course, it cannot possibly satisfy the demand because of the insufficiency of the equipment and because the demand itself is most abnormal, due to the voluntary postponement of business last spring and its enforced postponement in the fall on account of the steel and coal strikes.

Throughout federal control the service has been performed under the direction of the same railroad officers who were in charge during private control, and they have had the benefit of a unified use of locomotives, cars, shops and other facilities, which has added to the practicability of performing such a heavy service with such insufficiency of equipment. In passing, it is not out of place to mention the peculiar service rendered the public in anticipation of, during and after the coal strike. Prior to the strike coal transportation was increased up to 13,200,000 tons per week (even more than the war record). During the strike eastern coal was supplied to the west (where, generally, no coal was being produced) over routes never normally contemplated. During the strike the distribution of all coal was handled by the Railroad Administration. After the strike the equipment, badly dislocated on account of the abnormal long hauls to the west, was readjusted, so that in two weeks production was back to the normal winter basis.

6. The condition of the property.—A great confusion is frequently apparent about the condition of railroad property, it being assumed that the property is dilapidated and will be turned back to the private owners in a condition hardly susceptible of operation. This is utterly untrue. The railroads are functioning effectively, are carrying an extraordinary traffic and are in condition to carry it. With respect to equipment, locomotives will be in relatively good condition, considering that they will just have gone through from three to four months of winter weather, much of it severe. Passenger cars will be in good and safe condition, although the inability to obtain new equipment for the reasons above explained results in the equipment being on an average practically two years older than at the beginning of federal control, and there has perhaps been some loss in appearance. Despite claims to the contrary, freight equipment will compare favorably with the condition at the beginning of federal control, considering that its two years' additional age has not been offset by the purchase of as much new equipment as would have been purchased but for the obstacles above explained. During last summer the percentage of bad order cars attained, and on account of the shop strikes remained at, a high figure, but for several weeks has been down to a normal basis. As to roadway and structures, the government will likewise be able to show that on the average it has closely met its obligation to return the property in as good condition as when received. Undoubtedly difficulties as to obtaining ties, rails and ballast, and shortage of labor in putting them in, have resulted in shortages in these respects on various railroads, but not so as to interfere with the adequate performance of the public service, and to an important extent, on the average, any shortages in these respects promise to be offset by overmaintenance in other respects.

7. The effect upon investors resulting from federal control and its policy toward rate increases.—A disposition has been developed in many quarters to think that in some way federal control has been injurious to investors

in railroad securities. The fact is that such investors have been far better protected than they would have been without federal control. With all the existing uncertainties the prices of railroad stocks in general compare favorably with their prices in the month or two prior to the time federal control was decided upon, although some of the stocks are much lower. But many investors seem to think that the Railroad Administration owed them a duty to increase rates so that at the end of federal control the railroads would be generally self-supporting without any reference to the permanently established rate-making authorities. This entirely misconceives the function of the Railroad Administration. That function was to initiate rates so far as might be deemed expedient in order to sustain the cost of operating the railroads as a unit during federal control, and the important practical objections to premature or unnecessarily frequent increases in rates during federal control have been stated above. Congress did not contemplate that the director general would undertake to decide upon the rate structure necessary to enable all the various railroad companies to operate their properties separately and in competition and sustain their credit while doing so. The latter function is one which has never been taken away from the Interstate Commerce Commission and other permanent rate-making authorities and ought to be handled by them. If investors dissatisfied with the status of their railroad securities will compare the prices of the securities of railroad companies under federal control with the prices of securities of public utility companies not under federal control, the protection which has been accorded by the government, during federal control, to the railroad investors will be very apparent.

I have attempted this analysis with the earnest desire of clarifying the general understanding of the subjects discussed, believing that such clearness of understanding will be distinctly helpful in reaching correct conclusions upon the general railroad problem, and I submit my statements in the confident belief that they will be considered on their merits by a very great majority of the editors throughout the country.

Weekly Traffic Report

ACCORDING TO A REPORT ON traffic conditions for the week ended January 22, 1920, made to Director General Hines, revenue freight loadings and receipts from connections for the period mentioned as compared with the corresponding date for 1919 for the various regions were as follows:

Eastern region—Revenue freight loaded, 201,179 cars, an increase of 22,548 over 1919; receipts from connections, 232,610 cars, an increase of 28,629 over 1919. Allegheny region—Revenue freight loaded, 106,887, an increase of 20,512; receipts from connections, 153,711 cars, an increase of 2,922. Pocahontas region—Revenue freight loaded, 33,033 cars, an increase of 3,749 cars; receipts from connections, 15,311 cars, a decrease of 294 cars. Southern region—Revenue freight loaded, 127,055 cars, an increase of 17,335 cars; receipts from connections, 80,049 cars, an increase of 17,479. Northwestern region—Revenue freight loaded, 122,258 cars, an increase of 10,888 cars over last year; receipts from connections, 76,230 cars, an increase of 4,861. Central Western region—Revenue freight loaded, 124,621 cars, an increase of 19,277 cars; receipts from connections, 67,531 cars, an increase of 6,237 cars. Southwestern region—Revenue freight loaded, 63,425 cars, an increase of 10,668 cars; receipts from connections, 54,285 cars, an increase of 11,271 cars.

A summary of the report follows:

Eastern Region: Report dated January 24 states that amount of freight traffic offered for movement shows con-

siderable increase but acceptance has been restricted by necessary embargoes by reason of accumulations resulting probably from severe weather conditions of the past ten days. Passenger travel holding up well but there has been a great deal of delay to trains particularly through Central New York and New England owing to weather conditions.

Allegheny Region: Report dated January 23 shows low temperatures prevailing and resulting conditions have made it necessary to establish embargoes against eastbound traffic destined to New England and New York state points. Operations in New York harbor continue to be affected by icy conditions, but there is a slight improvement in accumulations for the New Haven and Long Island railroads. Some improvement is also noted in the accumulations beyond Toledo but the Allegheny region holdings are still heavy. Last reports indicate 124 pig iron furnaces in blast, 65 out of blast, a gain of 5 stacks as compared with the previous week.

Pocahontas Region: Report of January 23 states that with the exception of coal and coke business of the region as a whole shows some improvement over corresponding week of last year. Coal and miscellaneous car supply short throughout the region. Movement of freight traffic materially interfered with by slides and wire trouble caused by heavy sleet and rains.

Southern Region: Report dated January 22 indicates continued shortage of box cars due to increased traffic. Fertilizer movement has opened up and an increasing shortage is to be expected. Rice production in Louisiana 1919 estimated 19,712,000 bushels, which is the largest agricultural crop of the state. Reports indicate that additional cotton mills will be constructed in the Carolina territory. Mills continue operating on full time and there is a free movement of cotton factory products which should continue for some time to come. Travel generally during the past week was very good.

Northwestern Region: Report dated January 24. General business conditions continue favorable with manufacturers able to sell all the goods they can produce. In jobbing and wholesale lines more orders are being received than can be filled and future indications point to a continuation of this condition. Coal mines operated to full capacity and 100 per cent car supply was furnished. Movement of through coal from head of the lakes was very heavy but considerably curtailed account car shortage. Lumber business shows increased activity. Demand for lumber from all markets is unprecedented and nothing will prevent an era of prosperity in the lumber business except lack of transportation facilities. Passenger business continues heavy. Travel to California is unusually heavy and all available sleeping car space to that territory is taken far in advance.

Central Western Region: Report of January 23. Congestions still exist on some of the lines between Chicago, St. Louis and the Missouri River, due to accumulation of Eastern lines. Report on the food situation in Idaho indicates that the supply of food for livestock is rapidly diminishing and for the seven eastern counties of the state it is estimated that there will not be enough hay to last through the season. There is about 20 per cent less live stock on feed at present than ordinarily during this period of the year. Passenger travel continues to be considerably heavier than during this period last year, the heaviest movement being to California.

Southwestern Region: Report for week ending January 17 states that numerous shippers and receivers interviewed were quite optimistic in their comments on business conditions in general, the volume of output is greater than in corresponding period of last year and would be increased considerably if carriers were able to furnish sufficient equipment. Spring movement of vegetables has started from Gulf Coast territory estimated at 10,700 cars to move between now and June 1. This is an increase of approximately 100 per cent over last year's movement. So far weather conditions have been very

Henry U. Mudge

HENRY U. MUDGE, formerly president of the Chicago, Rock Island & Pacific and later of the Denver & Rio Grande, died at his home in Denver, Colo., on January 30.

Mr. Mudge was one of the large group of successful railway executives who have demonstrated the feasibility of climbing from subordinate tasks to positions of great importance. He entered railway service in 1872 as a section hand and water boy in a construction gang on the Atchison, Topeka & Santa Fe. His promotion from this time on was gradual rather than spectacular. By 1889 he had acquired a thorough knowledge of railway operation, having served during this period, for two years as a telegraph operator, one year as brakeman and baggageman, seven years as a conductor on freight, passenger and work trains, one year as a train dispatcher, two and one-half years as a roadmaster, two and one-half years as a trainmaster and a few months as an assistant superintendent.

Mr. Mudge was rewarded for his years of conscientious work and study when, on July 1, 1889, he was appointed superintendent of the Rio Grande division of the Santa Fe. He continued in this capacity until January, 1893, when he was transferred to the Western division with headquarters at Pueblo, Colo. In May of the same year, he was promoted to general superintendent of the Western Grand division of the same road and, from June 10, 1894, to February 1, 1896, held a similar position with jurisdiction over the Eastern Grand division. From the later date until January 1, 1900, during which time the Santa Fe was reorganized, Mr. Mudge acted in the capacity of general superintendent of the system. On January 1, 1900, he was appointed general manager and continued in this capacity until May 1, 1905, when he was appointed second vice-president of the Chicago, Rock Island & Pacific.

During this period, from 1889 to 1905, he participated, as an operating officer, in the extensive development of the Santa Fe. As such he was brought into contact with the solution of both local and general problems pertaining to this development and was called upon to advise upon and assist in its consummation.

Mr. Mudge's subsequent railway career requires more than announcement of the positions held. In connection with this portion of his career, it should be recalled that the syndicate purchase of the Rock Island, the reorganization of its board of directors and the organization of the two holding companies, the Rock Island Company of New Jersey and the Chicago, Rock Island Company of Iowa, took place in 1901 and 1902, and the purchase of the Frisco and Alton stock in 1903, all while Mr. Mudge was general manager of the Santa Fe and in no way connected with the Rock Island. Other financial transactions, which were criticised by the Inter-

state Commerce Commission, were either accomplished before he became connected with the Rock Island or before he became a director of the road, with the exception of the sale of the Frisco stock; and, as a matter of fact, were carried out entirely by a group of important financial interests, and not by the men in direct charge of the property.

He was elected president of the Chicago, Rock Island & Pacific on December 1, 1909, and as president of a road that was being severely criticised for its financial transactions, Mr. Mudge was called upon to face many difficulties. Whatever may be said in criticism of these financial transactions was not applicable either to Mr. Mudge, or to B. L. Winchell, his immediate predecessor as president. In regard to the sale of the Frisco stock, Receiver J. M. Dickinson at the time of Mr. Mudge's resignation as president, said: "It should be understood that there was a marked differentiation between him (Mr. Mudge) and most of the other directors, in that the transaction for which he voted as a director (the sale of the

Frisco stock) was presented and acted upon at a meeting at which he was elected a director, and immediately upon his election, and also, in that he was not a stockholder either of the Rock Island Company of New Jersey or the Chicago, Rock Island & Pacific Railroad Company of Iowa."

The Rock Island went into receivership in 1915 and Mr. Mudge was appointed co-receiver of the property. He resigned from this position on October 1, 1915, and was immediately appointed chief executive officer at the request of Receiver Dickinson, who desired Mr. Mudge to remain in charge of the operation of the road. On November 5 of the same year he resigned as president and chief executive officer and was elected president of the Denver & Rio Grande with offices in Denver, Colo.

It was the plan of the directors of the Denver & Rio Grande at that time to get a president for the property who had no connection with

other roads. The president of the Denver & Rio Grande had been holding the same office on the Missouri Pacific, the Iron Mountain and the Western Pacific, which previously had been under the same general financial control—a condition which had been changed shortly before Mr. Mudge went to the property.

Mr. Mudge resigned from his position with the Denver & Rio Grande in October, 1917, and retired from active participation in transportation affairs.

During his active railway service Mr. Mudge was unusually popular with his subordinates, with the public and with the executives of other railways. He was generally recognized as one of the ablest operating men in the country. As president of the Rock Island and later of the Denver & Rio Grande, his democratic manner and his open methods of conducting business gained for him the respect, not only of other railroad men, but also of the patrons of the road and of the press.



H. U. Mudge

Commissioner Clark on the Rule of Rate Making

THE BALTIMORE SUN, in its issue of January 28, published an interview with Commissioner Clark, of the Interstate Commerce Commission, on the subject of the rule of rate making which should be adopted in the pending railroad legislation. The interview apparently is authentic and is very interesting, not only because of the views expressed but because of Commissioner Clark's long experience on the Commission and his high reputation for courage, independence and fairness among both shippers and railway officers. The interview is as follows:

"In the first place it must not be assumed that anything I have to say is in criticism of the policy that has been pursued by the Railroad Administration. It is a matter of common knowledge that the operating expenses of the railroads of the country have increased in much larger proportion than their revenues. The first heavy increase in the wages of the railroad employees was made retroactive for six months or for one-half of the first year of Federal control; whereas the increase in rates was applicable only to the last six months of that year. Putting aside the question of the relationship between the wages and revenues for that year, and considering merely the calendar year just closed, the figures show that the operating ratio has been over 85 per cent. That means that out of every dollar received in revenues 85 cents has been paid out in operating costs, leaving 15 cents to cover taxes, interest on funded debt and return on other investments. No railroad could operate successfully under such a ratio.

Can't Have Two Rates

"Now the question comes as to whether we shall have by legislative direction a standard or recognized, reasonable level of rates. That proposition is contained in Section 6 of the Senate bill. Our experiences of the past show that for an accumulation of many reasons, including advantageous location, wise administration and popular management, some of the roads are very prosperous, and others are not, under the same level of rates. The unprosperous roads are important to the communities they serve and could not be abandoned without irreparable injury to many industries in these communities. They cannot charge higher rates than the prosperous roads under competition, as that would be the surest way for them not to get business. The great mass of tonnage moves along the line of least resistance in the way of freight rates. Therefore, if increased rates are to be given to the unprosperous roads that need them, they must also be given to the prosperous roads which do not need them.

"The only way that the unprosperous roads can be afforded real relief is by fixing a limit on the amount which the more prosperous roads may retain out of their earnings under the established rates. Some say that this is unconstitutional. But I do not see any great difference in principle between that proposal and the policy we have been pursuing in other directions. For example, we have been collecting excess profit taxes on the one hand and lending money in farm loans on the other; or we have been collecting income taxes graded in percentages according to the size of the individual income.

"Moreover, the plan proposed is just what would result if a single corporation or the Government owned all the railroads. The aggregate revenues, in that case, would be spread over all the properties, although some of them would earn more than the average and some less.

For Reasonable Rates

"The necessities for more coordination of our systems of transportation have been demonstrated, and it seems to me

that the best way of accomplishing this is by having an established, recognized, reasonable level of rates and a limitation on the amount which any carrier may retain. I have been and am against the proposition of taking the excess earnings from the prosperous roads and giving them to the unprosperous ones. But if the rates are fixed on a level that will permit of the reasonably profitable operation of the less advantageously located roads, operated on business lines and not held down by an overpowering burden of fictitious or injudiciously acquired debts, the excess earnings under these rates of the prosperous roads must be limited.

"I see no way of selecting a basis except by averaging the value of the properties in a given group and, having averaged these for a basis, it seems to me proper for a limitation on earnings to be fixed at the top. I believe that the moral and psychological effect of a recognized standard, fixed by legislation, would be far greater than that of any plan which would leave the determination of the base to be worked out by an administrative tribunal like the commission. I also believe that if it were fixed by Congress it would be accepted by the country as a settled question and would close all arguments and discussion as to what the standard percentage should be.

5½ Per Cent Not Extravagant

"A return of 5½ or 6 per cent is certainly not an extravagant one. Figures which we have compiled and presented show that the return from rates in past years of Class 1 railroads, which are railroad having gross revenues in excess of \$1,000,000 annually, have reached a trifle over 5 per cent on the book cost of the roads and equipment.

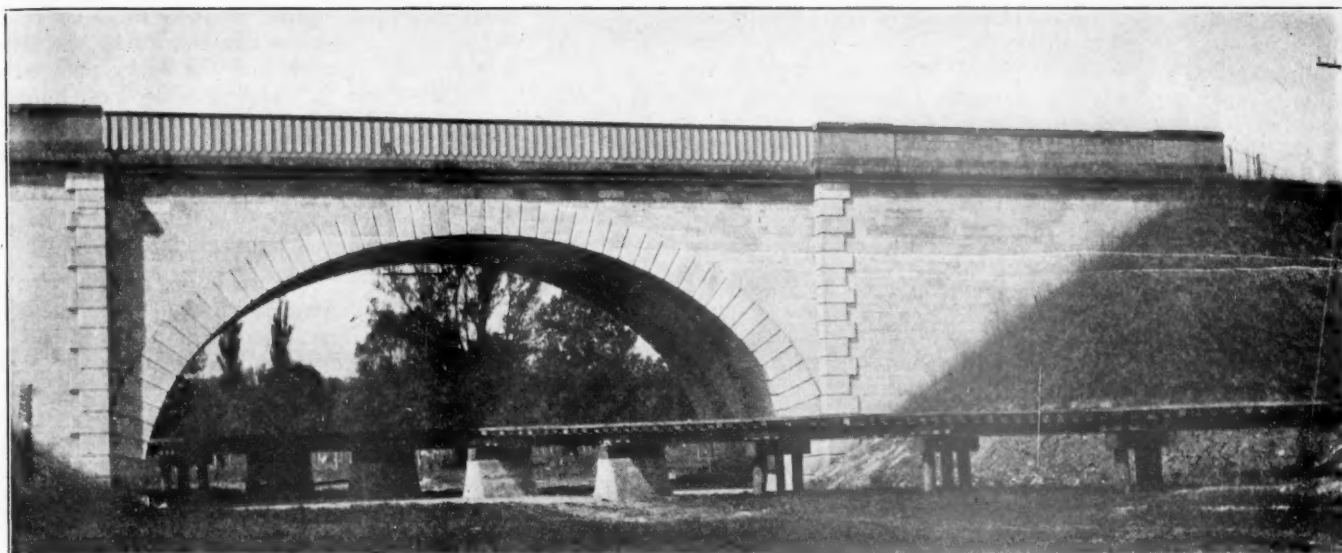
"In the meantime the railroads of the country must continue to run under Government regulation. The fact that a plan presents some difficulties is no sound reason to condemn it, if the principles underlying it are right.

Must Give Fair Treatment

"I am not disposed to rehash the evils of the past. I consider them seriously as applied to certain individual roads and as pointing the way for the avoidance of mistakes in the future. What we need more than anything else now is a realization by the owners of the railroad properties that they will receive fair treatment at the hands of the Government. If their properties have been looted and saddled with indefensible burdens of debt, they will have to work out their own salvation under fair treatment. The railroad managements must realize that the transportation business has got to be conducted on the same principles as any other business, and, being a public service under Government regulation, all people must be treated alike.

"The public must understand that private capital is not going to furnish the facilities of transportation unless assured of a reasonable return on its investment. The only alternative to private ownership and management of the railroads is Government ownership and operation. Therefore, the managers of the properties and the public each should contribute its fair share to relations between the railroads and their patrons, which shall be free from discrimination, fair as to service, and fair to the carriers in regard to the compensation they receive for services rendered."

THE LANSING (MICH.) TRAFFIC CLUB, composed mainly of traffic representatives of merchants and manufacturers, has been organized with the following officers: president, Normah W. Secor, Olds Motor Works; vice-president, Carl P. Hodges, Duplex Truck Company; secretary-treasurer, John T. Ross, Lansing Chamber of Commerce; executive committee, N. W. Secor; K. P. Hodges; J. T. Ross; Marshall S. Graham; John Thomson (agent, New York Central); H. E. McGiveron; W. W. Vanderbilt.



Bridge Under Chemin de Fer de l'Est near Void

The Light Railways of the Battle Front in France

How American Lines Were Built, with Reference to French,
English and German Practices

By Lieutenant-Colonel Frank G. Jonah

Chief Engineer, St. Louis-San Francisco, St. Louis, Mo.

THE FOLLOWING NOTES are the results of the writer's experience and observation in the construction and operation of "Light Railways" while acting as major of the Twelfth Engineers (Railway), U. S. A., assigned to the British army, and serving on the Picardy front from August 21 to October 27, 1917, and from that time until December 16, 1918, as chief engineer of the Department of Light Railways of the American Expeditionary Forces. The Light Railway was a development of the great war, and was gradually extended in scope and importance until, at the close of hostilities, the mileage of the lines ran into the thousands. These railways were among the principal agencies of transportation, having been, in fact, the link between standard-gage lines and the trenches.

It was found by the British, in 1916, that the transportation of supplies, necessary for the dense concentration of men at the front, could not be accomplished satisfactorily on the highways, and that some supplementary means of conveyance were necessary; therefore, orders were given for the development of a comprehensive system of light railways for the following primary reasons:

- (1).—To relieve the highways of traffic: In addition to the wear and tear on motor transport and the excessive use of gasoline, the wear on the roads was leading to a heavy traffic in road material, so that a large part of the traffic hauled by motor trucks was road material (crushed stone or gravel) to repair the damage which their own traffic was creating; and, consequently, there would be a great saving in labor in maintaining the roads if other means of transportation were developed.
- (2).—To assist in a rapid advance over shell-torn areas when the roads were useless for motor transport and little better for horse transport.

(3).—To convey road material for the rapid repair of roads in the destroyed zones.

(4).—To reduce manual labor at the front.

The lines were developed so completely that, eventually, nearly all heavy material was transported by the light railways, leaving the highways clear for light, fast-moving automobiles, trucks, and ambulances. The rail-head, or terminus, on the standard-gage line was usually 8 or 10 miles back of the front line—far enough to be out of range of the enemy's ordinary shell fire. Between the rail-head and the front, the standard-gage line was generally destroyed by enemy operations, oftentimes as he retreated.

At the rail-head were concentrated the supplies for a certain sector, consisting of ammunition, rations, forage, road material, building material, fuel, barbed wire, fence pickets, concrete material, culvert pipe, plank, track material, tools—in short, everything necessary for the sustenance of troops and for their means of offensive and defensive operations; and it was the function of the light railways to carry these supplies to the forward battery positions and front line trenches.

The lines were also used in moving troops up to the front, bringing back the relieved troops to their rest areas and the wounded from the front, and extensive use also was made of these lines in salvage operations. The extent to which they were developed can be readily expressed by stating that for every mile of front which an army held, there were ten miles of light railway supplying it.

The gage of track used by all the armies on the western front, including the German army, was 60 cm. (23½ in.), usually laid 2 ft. by the British and Americans. There was a great advantage in this uniformity of gage, as it permitted interchange of equipment among the Allies and the immediate use of the captured German tracks after successful offensives.

*Abstracted from a paper published in the Proceedings of the American Society of Civil Engineers for January, 1920, to be presented on March 3, 1920.

In a general way, the characteristics of the lines on the different army fronts were similar. Grades of 3 per cent and curves with a radius of 30 m. were freely used to facilitate rapid and easy construction. Embankments were made with 9-ft. crown, cuts with a 14-ft. base at sub-grade.

The French track was of built-up sections, 5 m. long, the rail weighing 9 kilos per meter, with steel ties, 1 m. long, riveted to the rail. The British used a rail weighing 20 lb. per yd. A certain amount of track was laid in short sections bolted to steel ties, but the greater part was laid with rails at least 24 ft. long, on wooden ties, 4 by 6 in. by 4 ft. 6 in., as it was found that track laid on wooden ties was much more easily kept in line and surface than that laid on steel ties. The American track was generally constructed on wooden ties, of rail weighing 25 lb. per yd., in 30-ft. lengths.

tem at the Sorcy rail-head, a line of 18½ miles long, on which the average speed of construction was 2,640 man days per mile. As this line, together with the shops and yards at Abainville, and the Sorcy rail-head, was the most important light railway job constructed by the American forces, and as several interesting engineering problems were presented in their construction, they will be described in some detail.

Most Important American Line

When the American troops first went into the line in the St. Mihiel Sector, the base from which their supplies were drawn was Toul. As the French had troops in the line immediately east of the Americans, and were also using Toul as a base, it became congested, and the French suggested

Table 1—A. E. F. Light Railway Freight Cars

	Box, covered	Gondola	Flat	Dump V shape	Tank
Capacity	600 cu. ft. 22,000 lb. 10,900 lb.	210 cu. ft. 22,000 lb. 9,000 lb.	22,000 lb. 8,000 lb.	27 cu. ft. 1,050 lb.	2,000 gal. 12,200 lb.
Length, inside	19 ft. 10 in.	19 ft. 8¾ in.	22 ft. 1 in.	5 ft. 8 in.	19 ft. 5½ in.
Width, inside	5 ft. 5 in.	5 ft. 3 in.	5 ft. 3 in.	4 ft. 8 in.	5 ft. ½ in.
Height, inside	5 ft. 8 in.	2 ft.	5 ft. 7 in.	4 ft. 8 in.	5 ft. 7 in.
Length, over coupler	24 ft. 1¼ in.	24 ft. 1¼ in.	24 ft. 1¼ in.	6 ft. 9 in.	24 ft. 1¼ in.
Width, over all	6 ft. 6¼ in.	5 ft. 7 in.	5 ft. 7 in.	4 ft. 8¾ in.	5 ft. 7 in.
Height, over all from rail	8 ft. 4¾ in.	4 ft. 4¾ in.	5 ft. 7 in.	4 ft. 5 in.	5 ft. 7 in.
Height, to floor	2 ft. 4¼ in.	2 ft. 4¼ in.	2 ft. 4¼ in.	17 in.	2 ft. 4¼ in.
Height of coupler	17 in.	17 in.	17 in.	17 in.	17 in.
Wheel base, truck	3 ft.	3 ft.	3 ft.	24 in.	3 ft.
Distance, C. to G. trucks	15 ft.	15 ft.	15 ft.	14 in.	15 ft.
Diameter of wheels	15¾ in.	15¾ in.	15¾ in.	14 in.	15¾ in.

A certain amount of track in built-up sections, with a rail, 5 m. long bolted to steel ties, was kept on hand for use at the extreme front. Sections of track in this length could be handled by a squad of men and coupled up without making any noise, and consequently were preferable for work near the trenches. Such sections also had advantages when building at night.

The German lines were built with rail weighing about 17 lb. per yd. on steel ties, bolted to the rails. They were extremely well built and had a greater mileage than the French and American armies. Their extensive use of these railways was due to the fact that they were short of rubber tires and gasoline, and could not depend on motor transport to the

that the Americans build an independent rail-head at Sorcy, 11 miles west of Toul, which was done. This rail-head had the necessary facilities for transferring material from broad gage to narrow gage, and from car to motor truck; also warehouses, platforms, etc. It was regarded as very convenient, and represents a typical layout.

From this rail-head at Sorcy, the American forces built a 60-cm. line to Cornieville (5 miles), where connection

Table 2—A. E. F. Light Railway Steam Locomotive

Type	2-6-2
Gage	23¾ in. (60 cm.)
Working pressure	178 lb. sq. in.
Curve, minimum radius	65 ft. 7¾ in. (20 m.)
Driving wheel base	5 ft. 10 in.
Total wheel base	15 ft. 7 in.
Length between couplers	21 ft. 7 in.
Height of coupler, rail to center line	16½ in.
Width, maximum	6 ft. 5 in.
Height, maximum above rail	9 ft. 3 in.
Weight on drive wheels	23,500 lb.
Weight on front truck	5,000 lb.
Weight on rear truck	5,500 lb.
Total	34,500 lb.
Tractive effort	6,225 lb.
Ratio of adhesion	3.7
Coal capacity	1,700 lb.
Water capacity	486 gal.

extent that the Allies did; but they were in a position to develop steam railway transportation, as they held the coal and steel districts of France and Belgium.

The speed with which tracks could be constructed by the different allied armies was practically the same. In September, 1917, the British stated that the construction of 1 mile of track, including ballasting, required 2,100 man days of labor. The "French Manual of Light Railway," issued in April, 1918, stated that their average had been ¾ m. per man per day, which is equivalent to 2,146 man days per mile.

On the American front, the most important line, and, the best constructed, was the connection between the central shops and storage yards at Abainville and the front line sys-

Table 3—A. E. F. Light Railway Gas Locomotive

Type	4-wheeled, 4-cylinder, 4-cycle, vertical, water-cooled
Gage	23¾ in. (60 cm.)
Wheel base	4 ft. 0 in.
Horse-power	50
Fuel capacity	30 gal.
Length over all	13 ft. 0 in.
Width over all	5 ft. 2 in.
Height over all	8 ft. 5 in.
Height of coupler, rail to center line	16 in.
Weight, total	14,000 lb.
Transmission	2 sets of speed change gears
Draw bar pull	{ High gear, 1,500 lb. (Level track) { Low gear, 3,000 lb.
Speed	Low gear, 4 m. p. h.; high gear, 8 m. p. h.
Brakes	Hand brakes to all drivers

was made with the French system of light railways radiating from Toul. They also took over the operation of the French lines on the west half of the sector, St. Mihiel-Pont-a-Mousson.

The location for the central shops and storage yards of the "Light Railway" system was a matter for careful deliberation. Many sites were examined and reported on, the objections to most of them having been that they were either too close to the front, too far to the rear, too far to the left, or too far to the right. It was necessary to find a location that would afford ample space for a large yard, with standard gage rail connection, and preferably canal connection as well. It was desirable also to have a location, at least, 30 km. back of the front line, as prisoners of war could be used if they were kept back that far; however, the Americans did all their work with their own troops.

Abainville, 2 km. north of Gondrecourt, was recommended by the writer, in March, 1918, as a suitable location for shops and yards, which recommendation was approved. Subsequent events proved it to be a most desirable location, as it was directly behind the St. Mihiel and Argonne fronts,

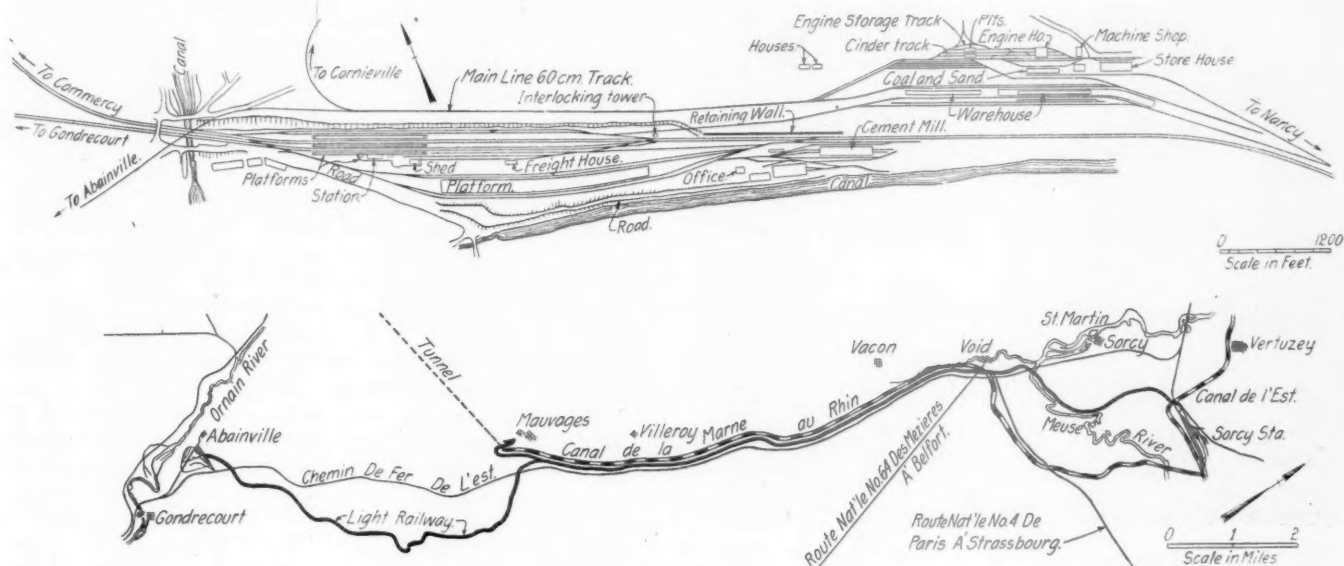
on which the greater part of the American operations were conducted. Abainville was 35 km. back of the line, and was not within the area usually bombed by the Germans.

The shops were designed for the repair of light railway locomotives and gasoline tractors and for the assembly and repair of freight equipment; and the yards were designed for the storage of track and bridge material. The whole

engine and auto repair shop, planing mill, two storehouses, car shop, foundry, blacksmith shop, power-house and oil house.

Skillful Location Required

In the construction of the line leading from these shops to the Sorcy rail-head, it was stipulated by the French au-

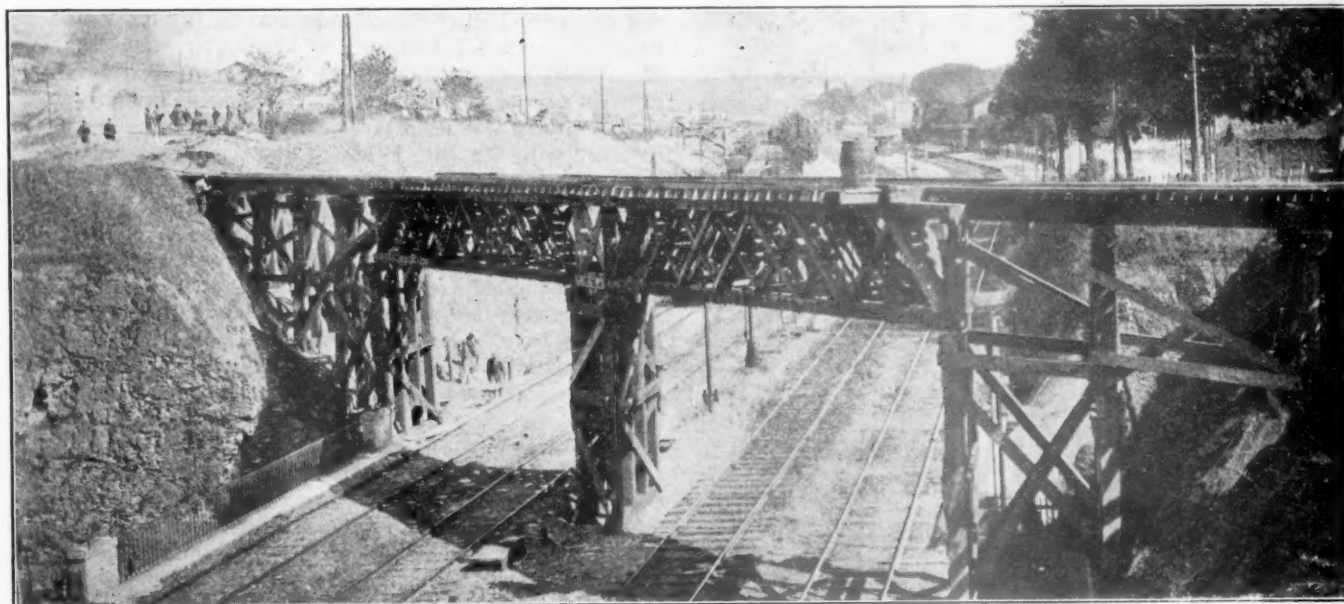


The Light Railway Railhead at Sorcy and the Location of the Light Railways from Abainville to Sorcy

plant covered an area of 116 acres. The track arrangement was such that material coming up from the ports on standard-gage was unloaded in the storage yard and subsequently taken to the front, as required, on the light railways.

The shop buildings consisted of the Austin type of steel building, and were erected by the American troops under

authorities, that there should be no grade crossings of the standard-gage railways and no interference with navigation on the canals. These requirements necessitated skillful location. The line was projected on the French standard contour maps (1 to 20,000) a study of which showed the feasibility of a line with grades not to exceed 3 per cent. An



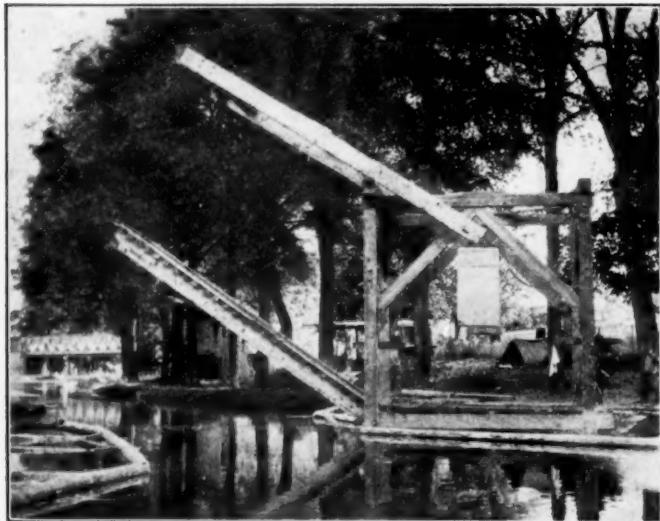
Bridge Over Chemin de Fer de l'Est, at Sorcy (Meuse).

the direction of a superintendent of the Austin Company, who had been sent over for that purpose. The buildings were of steel framework, boarded in with lumber obtained in France. The buildings were generally 40 ft. wide, 200 ft. long, and included an erecting shop, machine shop, gas-

examination of the route showed that the necessary crossings of standard-gage tracks could be made under the main line viaducts or through large culvert openings. These points were selected as the governing conditions of the location, and the line was run accordingly. It was found that the

French maps were extremely accurate—the summit elevations checked out exactly—the grade line and work was just what was expected.

It was necessary to cross the Marne-Rhine Canal at Void. The limited room for the 60-cm. line in this town necessitated crossing the canal at an angle of 68 deg., requiring a span of about 28 ft. to preserve the standard 6-m. width of



Lift Bridge Over the Canal at Void

waterway at right angles. Fortunately, the American engineers had some bridge stringers 8 by 16 in. by 28 ft., which had been sent over from the United States. The writer designed a counterweighted lift bridge with this material, which could be operated by one man. This proved so successful, that a standard plan was made for lift bridges, and as it was expected that most of the canal crossings could be



Lift Bridge Over the Canal at Void (Meuse)

constructed at right angles, a complete bridge was built and kept in reserve.

At Sorcy, it was necessary to cross the main line of the Chemin de Fer de l'Est, and it was near the junction of the line from Gondrecourt with the main line, that four main line tracks were crossed. The railway at this place crossed over the canal, and the 60-cm. line was located to cross the standard-gage tracks and canal at the same place. For-

tunately, this crossing occurred in a cut, so that the line could be carried across with the minimum of bridging.

No girders or spans were available for this crossing, and it was necessary to design and build a bridge with the available material. It was found that two deck Howe trusses, with a few bents of trestle approach, would fit the conditions, give the necessary clearances, and would be the most practicable type of structure. These trusses were built of 5-in. by 10-in. road plank, and each truss weighed about $4\frac{1}{2}$ tons. There was a locomotive crane working in the yard, which could lift 5 tons, so that after the bents were erected, the trusses were picked up by the crane and set in place in a few minutes. The whole bridge was framed and erected in five days, with no interference to standard-gage lines.

The Meuse river was also crossed by this line. At the place of crossing the stream was 125 ft. wide, with 14 ft. of water, and had very little current. The main line of the Chemin de Fer de l'Est was crossed in the Meuse river bottom through an overflow relief opening.

The types of engines and cars used on these railways are detailed in the tables. The steam engines would handle 60 tons of freight up a 3 per cent grade, but were not used up to the point where their smoke and steam would betray their presence to the enemy; some little distance back from the front lines they would be cut off, and the cars were handled to the extreme front by gas engine. The operating rules were extremely simple, and despatching was done by telephone.

Illinois Central Chicago Terminal Status

AGREEMENTS ON AMENDMENTS to the Illinois Central electrification and lake shore improvement ordinance has at last been reached by the City of Chicago, the railroad and the Chicago South Park Board. It is probable that a government permit for the \$110,000,000 improvements will be issued within 30 days. Charles H. Markham, President of the Illinois Central, has informed the city council that formal approval of the ordinance, the financial amendment agreed to by the city, and the War Department's reservations, was given at a meeting of the railroad's board of directors in New York on January 26.

The Chicago South Park Board has already filed its acceptance with the city, although another acceptance will be required owing to changes agreed to at the railroad's request. According to Attorney Walter L. Fisher, the city's representative, Secretary of War Baker, has signified his willingness to accept the amendments which the Illinois Central requested.

The much debated amendment, to which the city's representatives have at last agreed, would allow delays resulting from refusal by the government to permit the issuance by the railroad of long-term securities to be added to the time limits set in the ordinance. The amendment also would permit extensions of the time limits if delay in selling securities results from government orders. It specifies, however, that the railroad shall "proceed with all due diligence" to procure government approval of its plan for financing the project and also in selling the stocks and bonds issued. It is further stipulated that the corporation counsel of the City of Chicago may appear before any tribunal set up by the government to pass on railroad finances and argue the city's side of the case.

It is probable that, if the permit is issued soon, the Chicago South Park Board will submit a bond issue of \$30,000,000 to the voters this spring to pay for its part of the improvement. If the federal permit is granted at once it is probable that work will begin this summer, as the last moot point has been settled.

Return of Roads and Cost of Commodities*

Only 1.3 Cents of Every Dollar of Increased Costs in 1919 Was
Due to Higher Railroad Freight Rates

By Julius Kruttschnitt
President, Southern Pacific Company

IN THE PETITION of organized labor leaders, headed by Mr. Gompers, presented to the President on December 17, this statement occurs:

"Director General Hines and members of the Interstate Commerce Commission have shown clearly that the return of the railroads will involve an increase in freight revenue of close to a billion dollars, the rates being increased 25 to 50 per cent. This increase in rates, according to these same authorities, will be reflected in an increased cost of living of at least \$4,000,000,000 a year, possibly \$5,000,000,000. The American people cannot and should not stand such increases."

In a similar petition filed by organized labor leaders with the President on January 27, the following statement occurs:

"You are aware that the return of the railroads will involve an increase in freight rates of 25 to 40 per cent, since an additional railroad revenue of close to \$1,000,000,000 will be needed. Such an increase in freight rates means an increase in the cost of living, as estimated by your director general of railroads, of at least \$4,000,000,000 a year. This will be nothing short of a national calamity."

These are misstatements unfounded on fact that have so frequently been made that, if unchallenged, will deceive many who are without data necessary on which to base a correct opinion.

We can make a forecast of the future by remembering the past. The outbreak of the European war in 1914 marked the beginning of the rapid rise of prices from which we now suffer.

The cumulative effect of all steam railroad freight charges, which in their remotest ramifications can affect the values of commodities for the year 1914, which marked the opening of the war, has been weighed, and the same has been done for 1919. To establish the influence of freight charges on the high level of commodity prices in 1919 compared with 1914, the Interstate Commerce Commission's methods of computing tonnage and revenue statistics and ours in establishing prices being the same in both periods will not affect the soundness of these conclusions:

	1919	1914
Average commodity value per ton of "freight originated".....	\$119.00	\$56.00
Freight charges per ton originated.....	2.80	2.00
Increase in cost to consumer, 1919 over 1914.....	63.00
Increase in freight charges per ton.....	.80
Relation of freight increase to cost increase.....	1.3%

In other words, only 80 cents out of \$63, or 1.3 cents out of every dollar of increase in value of commodities in 1919 was caused by increased freight charges; the responsibility

Period	Freight Rates	Prices
1890 to 1895.....	-11%	-10%
1895 to 1900.....	-10%	+23%
1900 to 1905.....	+2%	+3%
1905 to 1910.....	+1%	+11%
1910 to 1915.....	-3%	+9%
1915 to 1917.....	-1%	+59%
Dec., 1917, to May, 1918.....	0%	+7%
May, 1918, to May, 1919.....	+25%	-9%
May, 1919, to Dec., 1919.....	0%	+17%

for the remaining \$62.20, or 98.7 out of every dollar, must be sought elsewhere. It was not caused by freight charges.

The figures in the following table, giving the fluctuations

* From an article in the February 2 issue of American Railroads, issued by authority of the Association of Railway Executives.

in freight rates and commodity prices for 30 years (Bradstreet's index numbers, 1892-1919; index numbers for 1890 and 1891 compiled on basis of U. S. Department of Labor index numbers), show at a glance that freight rates have had a substantially negligible influence on commodity prices:

Prices rose 23 per cent, 1895 to 1900, notwithstanding a fall in freight rates of 10 per cent.

Prices rose 59 per cent, 1915 to 1917, although freight rates fell 1 per cent.

Prices fell 9 per cent May, 1918, to May, 1919, while freight rates rose 25 per cent.

Freight revenue on Class I roads for 10 months of 1919 was \$2,950,000,000; a rate increase to produce 25 per cent more revenue would add \$850,000,000 thereto annually. This is fifty-eight one-hundredths of 1 per cent of the estimated aggregate value of all steam railroad-borne commodities for 1919. The average value of each ton transported was \$119; a rate increase to produce 25 per cent more freight revenue would add but 69 cents, raising the average value per ton to \$119.69.

The inaccuracy of Mr. Gompers' statement as to effect of 25 per cent and 50 per cent increases in freight revenue on commodity values is shown thus:

	Actual addition to commodity values	Mr. Gompers' statement of addition to commodity values	Percentage of error
25 per cent. increase freight revenue over 1919	\$850,000,000	\$4,000,000,000	370
50 per cent. increase freight revenue	1,700,000,000	5,000,000,000	190

Government Operation Not Conducted at a Profit

In the same petition Mr. Gompers and other labor leaders say:

"Government operation, as reported by Director General Hines, showed a net profit at the rate of \$168,000,000 a year for the three months prior to the coal strike."

A similar statement was recently made by Senator LaFollette.

In the petition filed by the labor leaders with the President on January 27, they say:

"The inefficiency of private operation of the roads is admitted by the owners in their demand for higher freight rates if the roads be returned and a guaranteed compensation, while, under government operation, present rates are yielding a net profit."

There is no shadow of excuse for such assertions, as correct data are public property. The only way to ascertain whether or not the government is earning a surplus in the heavy traffic months of 1919 is to compare the revenue in those months with that of the same months during the test period. Mr. Gompers does not state to what three months he refers, but the Operating Statistics Section of the United States Railroad Administration issues monthly a condensed income account (Form O. S. 7-B), from which the following footnote is taken:

"Standard return for this period is based on the proportion which the railway operating income in the same period of the three years of the test period bore to the total railway operation income during the test period."

This is said to be "closer to the facts than the former

method of applying one-twelfth of the standard return to each month." This statement shows that during the three months of August, September and October 30.2 per cent of the entire year's net revenue is normally earned, whereas one-fourth of the entire year's earnings would be only 25 per cent. It further shows for the 10 months ending October, 1919, the net federal income from operating the roads was \$121,000,000, or 20 per cent less than the same period of 1918, and that the net federal income for this period was \$259,000,000 less than the standard return properly allocated to this period. As there are two more months of the year, this deficit is likely to be increased by one-fifth, making it, say, \$310,000,000 for the whole year, instead of a net profit at the rate of \$168,000,000 per year as stated by Mr. Gompers. He is, therefore, wrong in his calculations of what government operation would probably produce by a matter of \$478,000,000 per annum, a percentage of error of 184 per cent.

Traffic Expert Sounds

Warning to the Public

IT WILL TAKE FIVE YEARS to bring the railroads of the United States up to a point where they can meet transportation demands of shippers when the railroads are returned to private ownership, is the warning recently given to the public by Seth Mann, traffic manager of the San Francisco (Cal.) Chamber of Commerce and member of the Western Freight Traffic Committee, with headquarters at Chicago. Patience and more patience during the next few years is the keynote of Mr. Mann's appeal, which follows in part:

"The first year after the return of the railroads to private control will be one filled with difficulties and obstacles to be met by the private carriers. It may be fairly anticipated that for at least a year they may not be able to furnish a transportation service equal in efficiency to the government service. The public should be prepared for this emergency, and the carriers should adopt a new attitude toward the public which will keep them informed of existing conditions. Failing in this, the public demand may swing back to public ownership.

"Upon the whole, competition in service produced in the past a better service than the United States Railroad Administration has been able to give. It remains to be seen whether the private owners can excel the government administration in the future. The shippers of freight are convinced that the dangers of public control far exceed any disadvantages attaching to lack of uniform or consolidated operation under private management. On the other hand, they look forward to the return of competition and the control of the various systems of railroads by the respective private organizations of expert railroad managers as an immediate solution of the transportation question.

"It is time to speak a word of caution and to advocate a patient though watchful waiting. The transfer of control from the government to private corporations comprehends a tremendous financial and economic change, a change surrounded by many more difficulties and problems than the taking of the roads by the government. This was a war measure and the winning of the war was the prime consideration. The American people clearly understood the situation and uncomplainingly and patriotically accepted it. Now, however, upon the return of the roads the situation is purely economic. The sentiment of patriotism is not involved. The conditions, however, have been fundamentally altered in the meanwhile, and the re-establishment of effective transportation systems out of the welded system of the whole country is complicated at once with hundreds of problems never before met in the history of railroads. These problems cannot be solved in a day or a month, or perhaps in years. It is during this time that the public should be patient.

"Some of these problems requiring time for solution concern the insufficient car supply. The total number of box cars now in service is less than the number in service five years ago, while the demand for cars is greater. The locomotive power at present available is not adequate to the present demand. Under centralized authority it has been possible for the federal organization to make distribution of equipment wherever required. With the return of the roads the problem at once presents itself of reaching some agreement for the control of distribution of cars not now sufficient in number for the business of the country.

"There will be a natural tendency to restore passenger trains that have been discontinued, with the addition of parlor cars and observation cars. It will be necessary for many roads to run passenger trains that have been taken off for economical reasons, leaving them with no passenger train service between given points. This will call for more passenger cars, with the result that the total passenger business of the country will be less efficient than it is now and dissatisfaction and complaint will follow until the situation is remedied. It is generally conceded that it will require more than one year to bring about any appreciable increase in railroad facilities, and at least five years with the expenditure of great sums of money to bring them up to the transportation demands of the country.

"In the meanwhile there should develop a new kind of railroad publicity and a new attitude of officers and employees toward the public. The public should be kept informed of the difficulties of reorganization and of the progress made and the plans for the future. The carriers will doubtless keep in close touch with shippers' organizations, consulting them as to changes contemplated in rates, rules, regulations and practices, to the end that a better understanding of the aim and purposes of the railroads may be extended to the public and that the public may know that carriers are working to the end desired by the public, namely, an efficient transportation service at a reasonable cost, and are working in the right way.

"One of the most significant events of the federal administration is the demonstration that railroad officials and shippers' representatives can accomplish traffic work competently and effectively together. The plan of the freight traffic committees has been successfully carried out, the representation on these committees being equally divided between the carriers and the public. This system, which has been in operation for over a year and a half, has effectively, and latterly with reasonable promptness, dealt with the railroad rates throughout the United States.

"It is plain that the carriers during the coming year will find it to their advantage to consult these shippers' organizations and to keep them advised as to contemplated action in the solution of the unnumbered railroad problems that arise in the future of railroad transportation. These organizations will form the natural conduit through which this information will flow to the public, and they will render their most cordial service in helping to solve these problems. This situation should bring about a new era in transportation, in which the public shall be made to feel that it is no longer excluded as hostile, but is taken into confidence as the friend and advocate of efficient transportation service under the management of private owners.

"A patient and careful trial should be given to private ownership under the new and extended system of regulation now under consideration of the conference committee of the House of Representatives and Senate. While the new enactment has not yet been passed by Congress, the Esch bill, which is the House bill, and the Cummins bill, which is the Senate bill are before the public, and many of the additional regulations are certain of passage. Under these statutes a new and extended system of regulation of railroads will be inaugurated, and should be given a fair trial. The duration of this trial should not be less than five years.

Bituminous Coal Mining Industry Must be Stabilized*

A National Problem in Which the Railroads Have a Vital Interest; Seasonal Coal Rates a Remedy

By Eugene McAuliffe

WITHIN A PERIOD of two years the coal industry of the United States has assumed not alone national but international importance.

During the winter of 1917-1918, due to lack of sufficient transportation facilities, largely occasioned by a prolonged period of extraordinarily rigorous winter weather, the nation's coal supply became exhausted and a condition approaching panic overspread that portion of the country lying east of the Mississippi river and including the cities of Chicago, New York, Cincinnati, Cleveland, Detroit, Pittsburgh, Washington and thousands of lesser places, all of which were carrying a vital portion of the nation's war load. Railroad trains and steamships stood idle in the face of a world crisis, and to save the advance of the American Expeditionary Force from becoming a charge on the bounty of our allies Great Britain sent a collier from a Canadian port to coal our supply ships waiting in New York harbor for the fuel necessary to cross the Atlantic.

With a recovery from this situation the nation set itself to the task of providing, during the year 1918, a supply of fuel sufficient to meet every demand, with the result that 579,385,820 tons of soft coal and 98,826,084 tons of anthracite coal was produced and distributed. The signing of the armistice on November 11, 1918, with a sharp recession in railroad and industrial consumption, plus an extraordinarily mild winter, created a requirement so far lessened as to cause the people completely to forget their bitter experiences of the year before. Today we are a nation substantially without coal, and a repetition of the winter conditions of 1917-18 would, perhaps, bring about a measure of suffering and deprivation equal to or even succeeding that of two years ago.

The Magnitude of the Coal Industry

The total production of bituminous coal in the United States for the calendar year 1918 of 579,385,820 tons carried a total value of \$1,491,942,849, an average of \$2.58 per net ton, and the anthracite produced in the state of Pennsylvania, 98,826,084 net tons, was valued at \$336,480,347, an average of \$3.40 per ton.

The total production of coal, anthracite and bituminous, in the United States from 1807 to 1918 inclusive, was 12,809,017,354 net tons. It is suggestive of the growth in importance of the coal industry that the 1918 production equalled 5.6 per cent of the total coal produced in the United States in the preceding 110 years. In 1880 the population of the United States slightly exceeded 50,000,000; in 1918 the population of the country had grown to 105,000,000, an increase of 110 per cent. The per capita consumption of coal in the meantime has increased from 1.42 to 6.44 tons, or an increase of 483 per cent.

Between 1850 and 1910 the rate of production of our coal mines practically doubled each ten years; this ratio of increase implies that the production of each decade to which it applies equals the total previous production.

The coal industry, basic and fundamental as it is, is not a healthy industry. It suffers from recurring ailments, including periods of stagnation followed by periods of high blood pressure and hysteria.

The occupation of mining coal has always attracted labor; in fact, labor of a rather superior sort has gone into the mines at times, and on the whole the miner is either in the majority of cases a good citizen or has the makings of one. But the business is unstable, speculative and unreliable alike to producer and consumer.

Conditions That Surround the Industry

Certain ingrained conditions exist which bring this situation about, the principal one being that of irregularity and lack of continuity of employment. The volume of material produced, the expense and deterioration that attend the storage of the product of a bituminous mine make it impossible to begin the day's operation unless two conditions are complied with: first, cars in which to load the day's production; second, a market in which to place the coal produced.

In the manufacturing of any other commodity storage for a few days, a week or even for several months' production can be provided. Thousands of men may be employed in the furnaces and mills producing steel, although no immediate market for the production may exist, but the work can go on and a relatively limited area will suffice for the storage of a material portion of the year's production of steel, totaling perhaps 40,000,000 tons. Grain and grain products can be stored in elevators and warehouses, lumber can be piled outside the mills to season and improve in the interim between the time of sawing and shipment; but not so with coal. The extra handling and the storage at the mines when no cars are available for shipment would mean a measure of degradation that would absorb the margin of profit made from the production, and when the market was forthcoming the cars required for reloading in excess of those necessary for the direct operation of the mine might not be forthcoming; and if cars were available an additional load would thereby be placed on the carriers.

The fundamental and crying necessity of the business is stabilization. The production curve, work day curve and worker's wage curve, as well as the profit and loss curve, all show too many peaks and valleys. These are conditions that must be cured if the business is to be removed from the domain of moral and financial uncertainty.

The number of days that the coal properties work per annum present a striking commentary on the measure of the fixed charges that accrue against each ton of coal produced. The average mine day throughout the United States will not equal eight hours in duration, piece-work labor rarely works a full eight-hour day, and while the bituminous mines worked in 1918 the maximum number of days shown in any year since 1890, when the compilation of work-day statistics was begun, but 83 per cent of the 300 working days were employed in producing coal. The average number of days worked in all bituminous and anthracite mines in the United States from 1910 to 1918 inclusive, are as follows:

Year	Bituminous	Anthracite
1910	217	229
1911	211	246
1912	223	231
1913	232	257
1914	195	245
1915	203	230
1916	230	253
1917	243	285
1918	249	293

*From a paper read before the Associated Engineering Societies of St. Louis, Mo., December 10, 1919.

When the figures for 1919 are compiled the result may prove as discouraging for the bituminous industry as that shown for the year 1914.

Related to the handicap of lost time, largely due to strikes and lack of cars in which to load the production, is the even more unfortunate seasonal spread suffered by the coal industry, whereby during certain seasons of the year the demand for fuel falls off to one-half the working capacity of the mines and in certain districts to an even lower point. During these depressed periods price demoralization becomes quite prevalent and mine labor, without power to earn, becomes correspondingly unhappy. A depressed period is invariably followed by one of hysterical demand and production, consumers in their frenzy bidding against each other to cover their requirements, it not being uncommon for purchasers to place orders for coal under the conditions just outlined equivalent to 500 per cent of their actual requirements.

The characteristic spread in demand, as between seasons, is well illustrated by the following statement of minimum and maximum month's production for the four-year period immediately preceding our entrance into the world's war:

Year	Month	Minimum		Maximum	
		Tons	Per cent of year	Tons	Per cent of year
1913	April	34,169,000	7.1	October	46,164,000 9.7
1914	April	23,609,000	5.6	March	45,455,000 10.8
1915	February	29,321,000	6.6	December	45,814,000 10.3
1916	April	33,628,000	6.7	January	46,596,000 9.3
Average		30,181,750	...		46,007,250
Ratio		100 per cent			152 per cent

The Strike of November 1, 1919

The result of this lack of stability in the industry, supplemented by the prevailing world-wide disturbances that have existed for some months, is wholly responsible for the general strike of November 1, 1919, ordered in defiance of existing contracts, a situation which culminated in mine labor challenging not only the integrity of the Chief Executive and Congress, but the United States courts as well.

The mine workers, smarting under the instability of the industry, sought a remedy in the declaration of September 22, 1919, which in substance demanded:

- A sixty per cent increase in wages.
- A six-hour day, five days a week, working time to count from entrance into until exit from the mine, instead of from arrival and departure from the working face as at present.
- Time and a half for overtime and double time for Sundays and legal holidays.
- That double shift work be substantially abolished.
- That all contracts now in force in the bituminous field shall be considered as having expired on November 1, 1919, new contracts to run concurrently in all districts for a period of two years.
- A weekly pay-day to be substituted for the existing semi-monthly pay day and the penalty for illegal striking now in force to be abolished.

Mine workers have some argument for the punitive demands made, which, however, if allowed, would increase the cost of the nation's bituminous coal \$2 per ton, or a total of \$1,031,983,776 per year, based on the 1919 requirements.

Why the Industry Should Be Stabilized

The effect of this fluctuating load placed upon the over-taxed transportation facilities of the country represents another great source of economic waste. During the summer months, the railroads, who own 974,547 coal-carrying cars, are ordinarily taxed for storage room in which to place their idle cars. Certain roads whose freight traffic is 50 or 60 per cent coal are compelled to send their cars abroad in order to find room for them. The matter of securing a per diem earning by placing their idle cars in service on other roads is another factor that cannot be overlooked.

With a decreased volume of freight traffic and earnings, repair forces and the purchase of car repair material are perforce restricted, and as each succeeding coal car remaining on the line develops the necessity for heavy repairs it is shoved back to the storage tracks, there subject to the pilferage of its expensive metal bearings, lubricating material and other removable and saleable parts. When the demand for coal sets in a hurried effort to organize a labor force is made, and the railroads enter into competition with the usual general fall demand for semi-skilled labor, which it frequently takes weeks to whip into but a reasonably efficient working machine. Again, the necessary repair material is frequently lacking, while non-coal carrying mileage is consumed in the hurried attempts made to recover the cars scattered abroad during the idle period. When measured from the standpoint of transportation requirements alone, it can safely be said that the stabilization of the bituminous industry would preclude the necessity of the railroads buying a single coal car for a period of at least two years, with a corresponding decrease in the demands made on locomotives and terminal facilities.

Stabilizing the industry would not only improve the condition of mine labor but would also very largely stabilize the car maintenance problem. A car that is moving and earning will always be maintained and repaired, and a marked increase in the average car miles per day would quickly materialize. When the rapidly growing coal tonnage of the country is considered in connection with the prices paid for it (prices must always bear a certain relation to the cost), any situation or condition that materially affects the cost of production becomes a matter of major economic concern.

When discussing the cost of idle time the distinction between a coal mine and a plant located on the surface must be given consideration. When the manufacturing plant is shut down for a holiday the doors are closed and the watchman is the sole tenant. This is not the case with a coal mine. The forces of nature work unceasingly. Water, gas, the downward movement of the roof and the upward heaving of the roadways and working forces continue to take place, and a large superintendence and labor force must be maintained each hour in the 24.

That a reduction of idle time losses would bring about an extraordinary decrease in production costs is borne out by a study of the results of short working hours suffered by 73 operators located in the New River district of West Virginia during the year 1917 which was made by Messrs. Garnsey, Norris and Allport, the Engineers' Committee of the United States Fuel Administration. The study covered the losses occasioned by an insufficient car supply over a 12 months' period and developed the facts presented in the following:

When car supply is below normal by this percentage	Coal cost is above normal by this percentage
5	3.0
10	6.0
15	9.0
20	12.0
25	15.5
30	19.5
35	24.0
40	29.0
45	34.5
50	40.5
55	47.0
60	54.5
65	64.0
70	74.0
75	85.0
80	98.0
85	113.0
90	136.0
92	156.0

Even though labor be paid a daily wage sufficient to admit of an adequate monthly return in the idle season, such an excess payment will lead to further recessions in production during the periods of peak load demand. Mine labor as it exists today has peculiar characteristics; high wages seemingly do not offer an incentive for continuous work. There

is a well-defined disposition to make a given monthly wage, regardless of the rate paid or the opportunity offered for work, and in some cases a limit on maximum wages is made effective through the mine workers' union.

The measure of the working time lost by failure of mine workers to report on individual days, even when the opportunity to work is seriously restricted by lack of market or transportation facilities, offers a startling paradox and one that the public is little familiar with. The average loss of potential working time in various mines as measured by the actual number of men who fail to report, compared with the total men on the pay roll on the days when work is available, frequently ranges from 10 to 25 per cent. Accurately maintained figures covering a period of 14 months for one mine showed that the cumulative loss was 9.4 per cent. In another mine during the month of October, 1919, with 25 potential working days and with a self-ordered strike impending, the loaders lost 25.7 per cent of the possible time they might have worked.

The penalty that attaches to a mine operation from a continuous loss of from 8 to 25 per cent of its producing power, heavy maintenance and interest charges accruing in the meantime is self-evident.

In justice to the mine worker, I will venture the opinion that if the unstable characteristics of the business were eliminated he in turn might develop a corresponding measure of stability.

To put the bituminous coal industry on a stable basis steps must be taken: (1) To provide more regular employment for mine labor (2) to reduce the cost of producing the total coal requirements of the country, with a corresponding reduction in cost to the consumer; (3) to avert periods of coal famine and interference with industrial production; (4) to remove a material portion of the heavy tax on transportation facilities during the fall and winter season, when operating costs are at the highest point and when the movement of cotton, grain and other agricultural products must be provided for.

The production and movement of coal during the period January to August, 1919, inclusive, with the production and movement necessary to complete the estimated requirement of 500,000,000 tons for the year and the actual production by months for the year 1918 are set forth in the table. If the nation's requirements are 500,000,000 tons a year, the monthly production and movement should approximate the figures set forth in the third group in the table.

PROPOSED BASIS FOR ANNUAL PRODUCTION AND MOVEMENT OF 500,000,000 TONS OF BITUMINOUS COAL

Month	*Production Jan. to Aug., 1919, inclusive, with requirements Sept. to Dec., inclusive, to total 500,000,000 tons		*Production under urge of war pressure, 1918		Rate of production to stabilize mine, labor and transportation demand	
	Tons per month	Per cent of total	Tons per month	Per cent of total	Tons per month	Per cent of total
January	41,485,000	8.4	42,227,000	7.3	40,000,000	8.0
February	31,556,000	6.3	43,777,000	7.6	40,000,000	8.0
March	33,719,000	6.8	48,113,000	8.3	42,000,000	8.4
April	32,164,000	6.4	46,041,000	8.0	42,000,000	8.4
May	37,547,000	7.5	50,443,000	8.7	42,000,000	8.4
June	37,055,000	7.4	51,138,000	8.8	42,500,000	8.5
July	42,754,000	8.6	54,971,000	9.5	42,500,000	8.5
August	42,880,000	8.6	55,114,000	9.5	42,500,000	8.5
September	50,207,500	10.0	51,183,000	8.8	42,500,000	8.5
October	50,207,500	10.0	52,300,000	9.0	43,000,000	8.6
November	50,207,500	10.0	43,895,000	7.6	43,000,000	8.6
December	50,207,500	10.0	40,184,000	6.9	38,000,000	7.7
Total	500,000,000	100.0	579,386,000	100.0	500,000,000	100.0

*Production as reported by U. S. Geological Survey.

How Can Stabilization Be Accomplished?

To bring equalization about it will be necessary for all consumers, including railroads, industries and domestic dealers and distributors, to purchase during the months of March to August inclusive about 50,000,000 tons of bituminous coal that is now ordinarily purchased during the remaining six

months of the year. This will not prove a serious task if divided proportionally among all consumers, but in order to bring about this result something more than argument or appeal must be offered; it has been proved that threatened interruptions in production, with the consequent penalty of higher costs and interference with business, will not make the average person provident. To obtain any substantial general results, its value not only must be established but paid for in cash at the end of the current month; in other words, 50,000,000 tons of soft coal for storage purposes will be purchased only when there is an immediate and definite reward for the purchase.

Several years ago the anthracite industry undertook the solution of its problem of recurring periods of light and heavy demand by making a reduction of 50 cents a ton in the selling price effective April first, this concession being reduced at the rate of 10 cents a month until the basic price was restored. The few companies engaged in the production of anthracite coal, heavily capitalized and well managed and in the majority of instances controlled by transportation companies, were able to work out by uniform agreement certain direct methods for the establishment of this arrangement, which in a few years has thoroughly taught the users of anthracite to make their purchases of hard coal during the summer months.

The fact that there are several thousand producers of bituminous coal, detached from railroad corporate alliances and subject to drastic anti-trust legislation, makes any definite agreement as to selling prices impossible and illegal. The intense competition that ordinarily prevails among the producers of bituminous coal during the periods of light demand and ample transportation facilities frequently leads to reductions in mine prices that often exceed the seasonal reduction made by the anthracite producers in the sale of that product. But the fact remains that only limited amounts of soft coal are stored outside of portions of New England and on the Great Lakes docks, where in nearly every case seasonal water transportation is a compelling factor.

The problem presents physical, economic and social aspects that can be solved by the employment by the transportation companies of an enlargement of the means long employed by the anthracite coal producers to adjust the anthracite demand more nearly to correspond to the production. The publication of seasonal coal freight rates with a reduction from the established basis from March to August inclusive, would assist very materially in remedying the existing conditions. The result of this adjustment is now made possible under the present measure of government rate-making control, which no doubt will be maintained and perhaps extended when the roads are returned to corporate management.

The theory of seasonal coal rates is not revolutionary; it has been in force in restricted localities for years. I have suggested that the reduction should take effect on March first in order that the coal accumulated during the six low rate months be consumed during the period of high railroad transportation costs to prevent carrying over the large tonnage now frequently on hand during the spring and summer months.

This principle should not be construed as one that might be used for the depression of coal freight rates; on the other hand, rates should be made with due regard to the interests of the transportation companies and the public. The reductions made during the months of March to August inclusive should be added to the basic rate and a corresponding increase maintained in force during the remaining six months of the year. It is important that the high and low rate periods be balanced, otherwise large industrial consumers, who buy approximately an even amount of coal monthly, would pay on an average throughout the year either more or less than the basic rate. Seasonal adjustments should be so applied

as substantially to maintain the existing coal rate relationships, and the rates governing coal moving to docks for export and bunker purposes should be exempt from the seasonal revision. The summer reduction, however, should bear such a relation to each of the several rates in effect as to give the greatest encouragement to the summer purchase and storage of coal at the points most remote from the source of supply in order to dispose of the long haul business during the winter season which is invariably compelled to pass through one or more highly congested terminals, and to restrict the radius of coal car activity during the winter months. Where the distance between the source of production and consumer is relatively short, and a rate of 75 cents or less a ton obtains, no reduction in freight rates should be made.

Much that is unfortunate has happened in the way of deterioration and losses occasioned by spontaneous combustion in the storage of certain bituminous coals. However, in the great majority of cases coal has been stored without regard to the selection of the proper grade and size to be stored, and the most indifferent conditions frequently surround such storage. In recent years, serious study as to the proper method of storing and handling bituminous coal has been made by various engineers and coal users, and there will be no difficulty in securing and handling, if necessary, 100,000,000 tons of bituminous coal that will store without serious loss.

National Regulation of the Industry

The extraordinary depression of the industry during the summer of 1919, together with the unfortunate strikes of November first, 1919, has strengthened my belief not alone in the desirability, but the imperative necessity for establishment of a Federal coal regulatory body whose duty it should be to analyze and make public all of the conditions that surround the coal mining industry. The relative earnings of the industry and its employees should be measured accurately and the wage demands of mine employees should be determined and maintained on a basis sufficiently high to insure the mine worker an adequate living for himself and his dependents with the same margin above the cost of living that is accorded men engaged in contemporary lines of employment. The hours of employment offered and available to mine workers, with the per cent of available time actually worked by individual employees should be accurately recorded, and the necessary recommendations made toward securing individual, as well as collective efficiency.

It is unfortunate that the government body now engaged in collecting the statistics covering the weekly production of coal were denied the scant appropriation necessary to do the work, which is now being carried on through the medium of an allowance gratuitously made by a trade organization. Without these statistics the nation, insofar as this industry is concerned, would be working in the dark. The conservation of the nation's coal supply and the distribution of the fuel produced in the several districts in such manner as will reduce transportation losses incident to the unnecessary cross hauling of fuel, are matters of national importance which are deserving of study. This body, constituting in effect a coal clearing house, should be established and maintained on the high plane occupied by our courts and should, therefore, be placed beyond the control or influence of partisan politics.

A few months ago the coal industry of the country clamored for ships and the privilege of exporting coal to European nations who were suffering the pangs of a coal famine of four years duration. The president of the United Mine Workers' organization personally crossed the sea to demand this opportunity for his members. Today, as the result of the hysterically caused partial cessation of production which took place on November first, the ships taken from other traf-

fic after bitter contest are back in that service and the fires of our European allies, France and Italy, are being allowed to go out. We are writing pages of our history today that we will wish to forget in the years to come.

Coal is a basic commodity; it lies at the foundation of our national welfare; it is the real heart of our industrial system. Separate from our internal situation we can not forget that we are a component and vital part of that world which has hardly yet begun to recover from a catyclism of five year's duration, and the pressing demands of our sister nations for fuel should be met. We have fuel. They are pleading for heat and light. The opportunity to serve our neighbors and ourselves should not be strangled by production and transportation disturbances.

The Public's Stake in the Railroad Problem*

By Francis H. Sisson

Vice President of the Guaranty Trust Company of New York

WITH MARCH 1, the date fixed by President Wilson for the return of the railroads to private control, only five weeks off, the question as to what is going to happen to the railroads is again the paramount issue of the day. And it is occasioning a particular concern because of the apparent deadlock between the Senate and House conferees over the pending railroad legislation.

If that deadlock continues much longer, there will not be time enough in which to enact adequate and satisfactory permanent legislation before the date set for turning the carriers over to their rightful owners. In that unfortunate event, either the President must postpone the return of the roads or Congress must pass temporary legislation which will extend the Government guarantee to the railroads for a period of months. And the resort to either alternative would be deplorable for many reasons, but chiefly because every day that the railroads are held under government control means just that much more deterioration in rolling stock and equipment—which now are dangerously inadequate to meet the increasing demands upon our transportation facilities.

Only a few days ago the director general of railroads, in discussing "the pressing needs of the situation," to use his own phraseology, explained: "The Railroad Administration has not at any time been, and, of course, is not now, in position to obtain the additional new equipment which is needed. Such equipment is chargeable to capital account and, of course, must be paid for by the railroad companies."

An indication of what this state of affairs and the delay in restoring the roads to private management means in cost and inconvenience to business generally throughout the country may be gathered from one fact, namely the existing shortage of cars which is preventing many industries from obtaining sufficient transportation facilities to supply their demands for raw materials and manufactures. The high cost of living, in fact, is attributed partly to the shortage of refrigerator cars in which perishable produce is shipped. Twenty thousand additional such cars are said to be needed to equip our railroads properly in this respect.

The most important problem to be solved in connection with the railroad tangle is that relating to the fixing of rates, of course. The question as to what rule shall be applied in determining the schedule of rates overshadows all others.

The Esch, or House, bill leaves this question for the Interstate Commerce Commission to answer, and, consequently, in view of past experience, does not meet the requirements of the critical situation. The financial and physical plight

*From an address before the Traffic Club of New York, at the Waldorf-Astoria Hotel, January 27, 1920.

of the railroads today should offer ample evidence of the peril that would impend were the fixing of fair rates left to the Interstate Commerce Commission.

The Cummins, or Senate, bill provides that the railways, for rate-making purposes, shall be allowed to earn an average of $5\frac{1}{2}$ per cent on the combined valuation of all railways in the fixed group, which may be increased to 6 per cent in the discretion of the Interstate Commerce Commission. If any individual railway should earn more than 6 per cent in any year, one-half of the excess between 6 and 7 per cent would be put into a general railroad contingent fund and one-half into a reserve fund maintained for the carrier itself. Of any excess earned above 7 per cent, one-quarter would be paid into the carrier's reserve fund and three-quarters would go into the general railroad contingent fund. After an individual carrier had built its own reserve fund up to 5 per cent it would turn into the general railroad contingent fund two-thirds of all earnings in excess of 6 per cent, and would be permitted to use the remaining one-third for its own purposes. The general railroad fund would be used to make loans to railways that could not raise money on their own credit or to buy equipment to be leased to carriers that could not buy equipment on their own credit.

A great deal of controversy has been occasioned by these provisions in Section Six of the Cummins bill, revolving about the questions whether there shall be a limit placed on the earning capacity of the railroads and whether the excess earnings of the stronger and more efficiently operated roads shall be divided with the weaker and less efficiently run roads.

The Paramount Issue

But the real issue involved is clear and simple. It should be recognized as such by Congress. The vital question is not what the railroads are entitled to, but what the public is entitled to. And the answer is self-evident. The public is entitled to, and must have, adequate, economical transportation service. The continued prosperity of the country is contingent upon the public obtaining that kind of service—and as soon as possible. The railroads must be allowed to earn enough to provide it. And in order to provide that service the railroads will be compelled not only to equip themselves efficiently but also to expand their facilities.

It has been pointed out that the gross earnings of the railroads must in any event, if the companies are to be saved from insolvency, exceed five billion dollars a year. It is difficult to understand how such a feat would be possible if the railroads be handicapped by a 6 per cent maximum earning power in attracting the new capital that is so imperatively needed to provide proper equipment and extend facilities. At least a billion dollars a year in new capital will be required by the railroads for several years; one authority recently estimated the amount at two billion dollars a year for three years.

Adequate transportation cannot be obtained without credit; credit cannot be secured without fair earning power; earning power cannot be sufficient without fair rates and just regulation.

Or, to approach the proposition from the standpoint of labor, efficient transportation is not possible without competent service, and competent service is impossible without fair wages and working conditions. Fair wages cannot be paid unless warranted by earning power, and earning power would be inadequate without fair rates.

Again, to approach the problem from the standpoint of the shipper, there will not be adequate or efficient transportation to bear his goods to market unless rates are high enough to command sufficient credit to invite capital, and pay sufficient wages to attract labor.

From every standpoint, we revert to the question of rates and, as the determination of that question lies in the hands of the public, through its duly authorized representatives,

the correct solution of the problem should depend only upon the public understanding of it. The chief danger of the situation is that the public, through failure to understand and appreciate the importance of the problem, may permit a solution, in whole or in part opposed to the general welfare, to be worked out under the pressure of selfish interests.

Roads Vital to Domestic and Foreign Commerce

Our railroads should be taken out of the field of exploitation into that of sound economics. They present a business problem to a business people, and should be accorded a solution conceived and worked out in the same spirit as our banking system.

Today this problem assumes even a greater importance than in the past, because of world conditions. The markets of the world lie open to American commerce and industry. If we can produce and distribute our surplus products economically so as to meet the competition of the world, we can continue and assure American prosperity.

Unless the United States safeguards its position by sound business practices, Europe, liberated from war and quickened by its necessities, eventually will again command international commerce.

No factor enters into this opportunity of greater importance than inland transportation. The railroads of this country must be able to furnish the transportation which will assure the production and movement of American goods, if we are to be factors in the world's trade. Such efficiency will demand many millions of new capital, scientific regulation and operation, and the elimination of the waste and the friction which have been forced upon the railroads.

New capital can be attracted as I have stated, only upon the basis of adequate earnings and fair regulation assuring a return which will make railroad investments and operation attractive. Neither brains nor money nor labor can be commandeered into such service or obtained without fair compensation. The railroads must have more partners and fewer creditors, more friends and fewer exploiters.

A non-political banking system has met our great test. Our next great step in economic progress should be toward a non-political railroad system. Only upon such a basis can we hope to maintain our prosperity through our ability to market our products. I would re-emphasize this point. Every farmer, every manufacturer, every laborer, every business man in the country is vitally concerned in efficient transportation as the first necessity of commerce.

The railroad problem is the immediate and intimate problem of all of us as citizens, and tax-payers, consumers and producers. If we are not able to solve this fundamental economic question fairly and sanely in the public interest through our duly accredited representatives, we shall have loosened the very cornerstone of our whole economic structure and must be prepared to see it tumble about us carrying disaster to special interest and general interest alike. Democracy faces the test. Can it function efficiently in such a crisis or must it learn the lesson through years of experiment and disaster? That is the question of the hour.

The greed of either capital or labor, the ambitions of politicians seeking an issue, the selfishness of shippers fighting to save dimes and losing dollars, the prejudices of theorists—the mistakes of the past and the animosities of the present—should not be allowed to interfere with the solution of the problem. The public stake in this situation is greater than that of any or all of the parties directly concerned and must be protected. Furthermore, the very protection of the public's interest implies justice and fair dealing to all, which cannot be assured by any other policy.

AT DURAND, MICH., railway employees have organized a co-operative association, for the purpose of operating a community store. The association will be capitalized at \$10,000.

Annual Report of Southern Regional Director

B. L. WINCHELL, regional director for the Southern region, in his annual report for 1919 to Walker D. Hines, director general of railroads, told of distinct progress in the direction of getting more passenger trains on time in the South, outlined the advantages secured from unifications of terminals and ticket offices, paid particular attention to efforts made to give adequate service to shippers, and outlined general railroad operations throughout the South.

Mr. Winchell stated that with the resumption of more normal conditions following the war a total of 44 passenger trains with average daily train mileage of 3,695 were restored during 1919 and new passenger train service inaugurated to meet new conditions necessitated adding to the service 26 trains averaging 1,878 train miles per day, making a total of 70 additional passenger trains per day, averaging 5,573 train miles per day.

The report submitted gave figures from January to October, 1919, inclusive, on passenger train performances, indicating that while in January 85.4 per cent of the passenger trains in the Southern region maintained schedules or made up time between terminals, 90.45 per cent maintained their schedules or made up time between terminals in October.

Mr. Winchell pointed out that the consolidated ticket offices in the Southern region handled a much larger volume of business during 1919 than in 1918 or than was handled by the individual city ticket offices before government control in 1917.

Summarizing his conclusions as to the results of unifications in the Southern region, Mr. Winchell said "beneficial results were greater than had been anticipated, in spite of limiting conditions, and out of the experience may come a program looking toward ideal terminal operation in the future and abandonment of the practice of individual roads expending large sums for independent terminals which frequently duplicate existing facilities.

"No complete test of the merits of unification is possible without providing modern facilities to meet the enlarged requirements, a thing which could not be undertaken under the temporary regime of the Railroad Administration.

"There are limits beyond which actual physical unification should not be carried. For example, in large cities a single great freight house probably would be undesirable both because of the impracticability of economically operating such a plant and because of the long distances over which shippers would be obliged to haul their freight. However, a main or central receiving and delivery house with branches advantageously located, all under one organization, might solve the problem."

The regional director pointed out that early in 1919 there was a growing car surplus because of lack of business, but that after June 1 increasing demands began to reduce the surplus and by August 1 it became difficult to meet all demands for cars. Mr. Winchell showed how the appointment of special committees on car handling and terminals, on which the public has been represented, materially assisted in facilitating the movement of cars.

He continued: "The furnishing of cars for the movement of the Florida fruit and vegetable crop, the Georgia peach crop and cantaloupes from various sections was handled by the Refrigerator and Tank Car Department of the Car Service Section in co-operation with the Fruit Growers' Express, the regional organization participating to the extent of assisting the movement of empties to the best advantage. There was no shortage of cars at any time during the year for these movements, and the transportation in general was satisfactory, with the exception of a temporary shortage of

ice for the Georgia peach movement, due to the inability of the Fruit Growers' Express Company to secure a sufficient supply. The supply of cars for the movement of watermelons was handled through the regional organization and every advantage taken of short routing and relocation of equipment to insure a full supply with a minimum of waste equipment. There was no shortage of cars for this movement."

Mr. Winchell stated that the coal situation became acute in October owing to the strike of coal miners, effective November 1, and pointed out that as a consequence special efforts were put forth to move cars to the mines to insure a maximum output, and that good results were secured from this drive until the day of the strike, November 1.

The work of preventing loss and damage to freight was dwelt upon particularly by the regional director, who stated that the material increase in the value of all commodities handled by all railroads has greatly augmented their accounts for loss and damage, even though there has been no material increase in the number of claims presented. He stated that while complete statistics were not available, reports from 70 per cent of the total mileage of all roads in the South showed that for the representative month of June, 1919, compared with the same month in 1918, there was a decrease in the number of new claims received of 30 per cent and a decrease in the amount of money claimed of 37 per cent.

"We have endeavored," said Mr. Winchell, "to develop the commodities upon which our losses are heaviest and to study the situation as relates to them, with the view to the elimination of the cause for such losses."

Mr. Winchell also paid particular attention to service work on the railroads in his region, telling of the establishment of the Southern Freight Service Bureau, with central offices at Atlanta and branches in 15 cities in the Southern region.

"The efficiency of the bureau has steadily increased," he said, "as has also the volume of the work handled. The central and branch bureaus handled approximately three thousand tracers per week, and in addition undertook to aid shippers in other ways, either directly or by placing their requests or difficulties before the proper officials of the railroads involved."

The total movement of traffic in the South in consideration with that of 1918 did not keep pace with the increases shown in some of the other regions, the regional director said, because of the abnormal volume of military traffic moved through the Southern region in 1918, because of the exceptionally large 1919 grain crop in other regions, because of the insufficient number of ships available at Southern ports for the prompt movement of export traffic, and because of the strike of employees at the phosphate mines lasting several months and largely restricting the production of tonnage of this commodity, which is a considerable item.

Discussing the increase in operating expenses and the consequent shrinkage in net operating revenue in 1919 in his region, Mr. Winchell stated that this situation was mainly affected by the use of a uniform and nation-wide higher scale of wages, by the fact that there were irreducible expenses of operation which could not be made to fully accord with reductions in the traffic movement and by the results of the unauthorized and illegal strike of shopmen in August, which affected lines in the South to an unusual degree.

THE REFRACTORIES TRAFFIC ASSOCIATION, at its annual election held at St. Louis, Mo., on January 4, choose the following officers for the ensuing year: A. H. Killinger, traffic manager of the Laclede-Christy Clay Products Company, president; F. W. Depp, traffic manager of the Evens & Howard Fire Brick Company, vice-president; J. C. Iselin, traffic manager of the Blackmer & Post Pipe Company, secretary.

Highway Transport Conference at Chicago

Deficiency in Transportation Facilities Cited as an Aid to the Development of Motor Transport

THAT THE EXISTING DEFICIENCY in railway transportation facilities will require the utilization of the motor truck and motor transport for short-haul freight transportation was the theme embodied in practically all of the papers read before the sessions of the Highway Transport Conference, held at Chicago from January 24 to 31 inclusive. A large majority of these papers referred at length to the data concerning this deficiency published in the Six Billion Dollar Number (January 2) of the *Railway Age*, and drew the conclusion from these figures that, inasmuch as this enormous deficiency cannot be made up within the next few years, the motor truck must—and will be—extensively used for the handling of l.c.l. freight for distances varying according to the condition of public highways. In support of these conclusions a great many cost and service comparisons and predictions were marshalled, all tending to show the inability of our present transportation plant to handle short-haul traffic adequately and economically and the necessity, from a financial standpoint, of the consignment of this type of traffic to motor transport.

The convention was opened on Saturday evening, January 24, with an address by Governor W. L. Harding of Iowa. The following three days, and on Friday, January 30, afternoon and evening sessions were held, the afternoon sessions being primarily for those engaged in the motor truck business and the evening sessions primarily for motor truck owners, operators, shippers and others interested in highway transportation. On Thursday morning, January 29, afternoon and evening sessions were scheduled, under the direction of the National Highway Traffic Association in conjunction with its annual convention. The morning session, however, was postponed and a portion of the session's program was presented in addition to the regular program arranged for the afternoon and evening sessions of the same day. The closing session was held on Saturday afternoon, January 31.

Of particular interest to railroad and traffic men interested in the development of the motor truck as a short-haul carrier were the papers read at the evening session on January 26 devoted to the general subject of "The Motor Truck and Railroad Freightage." At this session W. J. L. Banham, general traffic manager of the Otis Elevator Company, Chicago, presented a paper on "Cost and Service Comparisons," the discussion on which was started by Frank T. Bently, traffic manager of the Illinois Steel Company, Chicago, H. Lorenzen, general superintendent of the Hartman Furniture & Carpet Company, Chicago, also presented a paper at this session on "The Economic Range of the Motor Truck," the discussion on which was started by Charles W. Reid, manager of the Transportation Bureau of the Federal Highway Council, Washington.

Mr. Banham, in making cost and service comparisons between short-haul freight moved by rail and by motor truck, said in part:

"There seems to be no question at the present time that the carrying of l.c.l. shipments to short-haul points by rail is not only expensive to the shippers but is also unprofitable to the carriers. Until recently it seemed to be almost necessary for the shippers to use the rail carriers for the movement of their l.c.l. shipments to nearby points, regardless of expense and delay, as the motor truck operators did not seem to make any organized effort to take care of this class of freight.

"It is extremely difficult for the carriers to figure the cost of transportation of package freight hauled short distances,

and particularly to such points on which they do not have a through car movement. It is equally difficult for the shippers to ascertain the cost of transporting similar freight. Transportation costs do not necessarily mean l.c.l. freight rates and motor truck rates, although both rates are a part of the transportation costs.

"What I understand to be a true transportation cost is all expense involved in making a shipment, starting with the boxing or packing expense, together with handling expense in the shipping department, the loading of freight on teams for delivery to the freight house, teaming charges from the shipping department to the local freight house, and additional labor incidental thereto. To this must be added the l.c.l. freight rate and additional charge for cartage at the delivery point, with such other expenses that may be caused by requests for tracing, duplication of shipments lost or damaged in transit, entering of claims, checking of freight bills, delay to shipments in transit and the expense of carrying additional stock to take care of freight in transit when moving via rail carriers.

"If you will make an analysis of the charges covering your shipments it will be of interest for you to know the amount it costs to make l.c.l. shipments, and if you will compare these costs against the same shipments moving via motor truck you should be in position to eliminate a number of the cost items by reason of the fact that it is not necessary to go to the same expense for packing or boxing freight shipments when moving via motor truck, inasmuch as there is usually no transfer in transit.

"For the information of truck users I have compiled some figures showing the cost of freight movement compared with the same movement via motor truck. These figures are worked out on an average basis, and while substantially correct they may not cover peculiar local conditions. We have included in the freight cost the first-class rate, plus 30 cents per hundred pounds teaming charges at shipping and receiving point. To these costs must be added 17 per cent for the cost of carrying the increased weight caused by heavy boxing and 24 cents per hundred pounds for the increased cost of boxing. The rate via motor truck covers delivery from the shipper's warehouse to the receiver's warehouse, and I have averaged this rate and believe it to be a fair one to use in connection with the freight movement.

COMPARISON OF COSTS BETWEEN L. C. L. MOVEMENT AND MOTOR TRUCK TRANSPORTATION ON PER ONE HUNDRED POUNDS.

From Newark, N. J., to:	Via freight	Via motor truck
Yonkers, N. Y.	\$1.00	\$0.20
New York City.....	.88	.15
Passaic, N. J.....	.88	.15
Paterson, N. J.....	.88	.18
New Brunswick, N. J.....	.88	.35
Trenton, N. J.....	.88	.55
Philadelphia, Pa.98	.75
Downington, Pa.	1.11	1.10
Bridgeport, Conn.	1.12	.75
New Haven, Conn.	1.12	.80
Waterville, Conn.	1.12	.85
Hartford, Conn.	1.12	.95
Providence, R. I.	1.21	1.15
Port Jefferson, L. I.98	.75
Asbury Park, N. J.....	.94	.45
Allentown, Pa.	1.05	.75
Bethlehem, Pa.	1.02	.75
Easton, Pa.95	.70
Kingston, N. Y.....	1.06	.75

"I consider one of the greatest savings made possible by motor truck transportation to be in lumber and other material used for packing, together with additional labor and other charges incidental thereto. The amount of this saving,

however, will be controlled largely by the material to be boxed or packed and how much less protection can be used when moving via motor truck as against a l.c.l. movement via rail.

"Any comparison of service between rail movement and motor truck movement is entirely in favor of the motor truck, as it is necessary for the motor truck operators to make delivery in the shortest possible time in order to operate their equipment financially successfully.

"The congestion of freight on the various piers and terminals is caused largely by the accumulation of l.c.l. shipments, and I am of the opinion that this congestion can be largely relieved by the increased use of motor truck transportation to short-haul points."

Mr. Bently, in discussing Mr. Banham's paper, cited the existing deficiency in transportation facilities and the opportunity for the development of the motor truck as a short-haul carrier, however emphasizing the fact that until this deficiency is so made up that the railroads will be enabled to adequately handle road-building materials highways cannot be constructed and the motor truck will therefore be unable to give such service as will permit of its establishment as the logical carrier for short-haul l.c.l. traffic.

Mr. Lorenzen, after stating that the economic range of the motor truck is governed by: first, good roads; second, legislation; third, the kind of hauling; and, fourth, the rate or remuneration, said in part:

"The opportunity for motor truck freighting is immense. Railroads and express companies are no longer giving the prompt service to which the public is entitled, rates are going up and service is going down; the so-called short-haul has forever furnished the argument of the railroad companies for increase in freight rates. It is the so-called short-haul that will give motor truck freighting its start and its first economic range, and the greatest opportunity to demonstrate that express service is possible between cities lying from 95 to 100 miles apart.

"It is said that back of every railroad employee there is an investment of about ten thousand dollars in equipment of one kind or another. It is represented in rolling stock, in roadbeds, in tracks, vast buildings, depots, repair shops, etc. This is an investment which creates a fixed charge that the motor truck owner is not concerned in.

"The improved railroad transports merchandise a distance of one thousand miles at perhaps a less expense than the stage coach did for a distance of fifty miles. At that, transportation cost during the last few years has increased steadily, and with the increase of transportation cost the railroad's expenditure for equipment has increased proportionately—we will grant this—but with a range of motor truck transport scientifically worked out, rates will be much less."

The haulage problem of the farmer was discussed at the Tuesday evening session. The necessity for the quick movement of commodities produced on farms to nearby markets was emphasized, and the comparison between the service which could be rendered by motor transport and the service which is now being rendered by rail carriers was presented.

The evening session on Wednesday was devoted to a discussion of developments in transportation, particularly the rural motor express and the "ship-by-truck" movement.

The two sessions on Thursday, January 29, held under the direction of the National Highway Traffic Association, were devoted to the presentation of the reports of committees of the association and the reading of papers on the general subject of highways and motor transport. Professor Henry E. Riggs, of the University of Michigan, prepared the report of the committee on "The Inter-relationship of Highway, Waterway and Railway Transport." This report was presented to the association by Professor A. H. Blanchard, professor in charge of highway engineering and highway trans-

port, University of Michigan, and president of the National Highway Traffic Association. The report in general contained recommendations to the association as to the various phases of the highway transport problem, which should be studied by a committee during the coming year. In closing his report, Professor Riggs stated that without question the railroad is and always will be the most efficient carrier for long-haul traffic, but that motor transport for short-haul traffic should be developed to supplement our railroad system.

At both of the Thursday sessions it was charged by several of the speakers that railroad interests are not wholeheartedly behind the development of the motor truck as a short-haul carrier, although it is readily admitted that this traffic is handled by the railroads at a loss. Supplementing this charge was another, brought forward by speakers on the legislative aspect of the situation, who charged that many of the state railroad commissions are under the control of railroad interests and are therefore doing all in their power to hinder the development of motor transport.

Derailment at Grand Isle, Vermont

ELEVEN PASSENGERS suffering from frost-bitten limbs, after being partly submerged in Lake Champlain, when the temperature was 38 deg. F. below zero, was the exciting outcome of a derailment which happened on the Rutland Railroad near Grand Isle, Vt., on Saturday morning, January 31, about 6 o'clock. Northbound passenger train No. 51, made up mainly of sleeping cars from New York and Boston, was thrown off the track by a broken rail and one sleeping car fell down a low bank and was overturned, breaking the ice and lodging partly in the water of the lake. Most of its occupants



Passengers in Lake Champlain with Water 70 Degrees Below the Freezing Point.

were thrown to the front end of the car, and, until rescued, were in imminent danger of being frozen in the icy waters. Passengers in the two sleeping cars at the rear of the train, not overturned, joined the trainmen in rescuing the victims, and as soon as possible they were taken to hospitals and hotels in Burlington, about 20 miles south of the point of accident. About twenty passengers altogether, were injured, but aside from the suffering due to cold the injuries were all classed as not serious.

The accident happened near the bridge across Hibbard Bay. The two engines, baggage car, and one sleeper held to the tracks as the train went bumping along for several hundred feet, and the fore part of the train was on the bridge when the other cars rolled off and down the bank.

Conferees Come to Agreement on Railroad Bill

Statutory Rule of Rate Making Accepted With Fifty-Fifty Division of Earnings Over Six Per Cent

WASHINGTON, D. C.

A NEW ERA in the regulation of the railroads will be inaugurated on March 1 under the terms of the agreement reached on Wednesday, February 4, by the conference committee that has been working since December 22 to reconcile the conflicting features of the Esch and Cummins bills passed by the House and the Senate respectively. A few details and refinements of language remained to be settled, but it was announced that the final report of the conferees would be submitted to Congress by the first of the week and that it would undoubtedly be accepted by Congress before March 1.

The agreement as announced provides for a statutory rule of rate-making by which the Interstate Commerce Commission will be required to so regulate rates as to provide a net return of $5\frac{1}{2}$ per cent, with a permissive $\frac{1}{2}$ per cent additional for what are generally termed non-productive improvements, on the aggregate value of railroad property in a rate-making group or district, and railroads earning over 6 per cent on their value will be required to contribute one-half of the excess to a general railroad contingent fund, to be administered by the commission. After two years from the passage of the act, or after a year and one-half from the expiration of the six-months' period also provided in the bill during which the railroads will continue to be guaranteed the present standard return, the Interstate Commerce Commission may readjust the percentage and change it from time to time thereafter, but for the period named, which was to be definitely determined after further conference, the bill will constitute a general guaranty to the railroads as a whole of $5\frac{1}{2}$ per cent upon the value by groups and thereafter the commission will be required to observe a definite percentage standard of reasonableness. The provisions for a division of the excess earnings are to remain effective. Provision is also made for the building up of individual railroad reserve funds until they reach 5 per cent of the value, after which any excess earnings may be used for any proper corporate purpose.

The House conferees therefore agreed to accept not only the principle but most of the details of Section 6 of the Cummins bill, except that the commission may change the percentage after two years, instead of every five years as provided in the Cummins bill, and the railroads are allowed to retain a more liberal division of the excess earnings. The Cummins bill provided for the retention of only one-half between 6 and 7 per cent and one-fourth above 7 per cent until the individual reserve funds are built up and one-third above 6 per cent thereafter. The House bill contained no rule of rate-making and the House conferees held out until the last against the stating of any percentage in the law, although they were willing to have the commission determine a percentage.

To win the acceptance of Section 6 the Senate conferees sacrificed the other distinctive features of the Cummins bill providing for a prohibition against strikes, for a plan of compulsory consolidation with reincorporation under federal charters, and the transportation board, which was to take over many of the administrative functions of the Interstate Commerce Commission and some new ones created by the bill.

In place of the anti-strike clause an agreement was reached on a plan for the settlement of labor controversies by a series of adjustment boards, composed of an equal number of representatives of the railroad managements and the employees, and an appeal board of five members appointed by the Presi-

dent to give final decisions in cases where the adjustment boards are unable to agree and to represent the public interest.

The details regarding the number and organization of the labor boards, as well as several other important but comparatively minor provisions of the bill, were to be taken up by Senator Cummins and Representative Esch on Thursday for final adjustment. Meanwhile the exact details of the language to be used has not been made public. The members of the wage boards will not lose their representative character, they will retain their connection with the railroads and the labor unions and will not be government officials, the purpose being to preserve as much as possible of the idea of voluntary adjustment, but the appeal board will decide where they are unable to agree and Senator Cummins said that it would protect the public interest against an agreement that might represent a burden upon the public, which is taken to mean that it would have a veto power. It is hoped that a final decision of such a board would have sufficient backing of public opinion to prevent a strike except in the most serious cases.

The House conferees persistently refused to accept any plan that would make strikes unlawful, even without a penalty, representing that it would be impossible to get a bill through the House including such a provision, over the opposition of the labor organizations. The House is also strongly opposed to the idea of a percentage standard of rate-making and it is expected that the inclusion of this feature will require more of a fight in the House than in the Senate against the bill as a whole, but the determination of the Republican majority to pass a railroad bill before the date set by the President for the return of the railroads to private management is counted upon to put it through.

The provisions of the House bill for permissive consolidations with the approval of the Interstate Commerce Commission will be retained, strengthened by authorizing the commission to make a general survey and prepare a general plan of consolidation with which all voluntary plans for consolidation must comply before being approved. The plan for federal incorporation, which was an incident to the Senate bill plan for consolidation, was abandoned and the obstacle of state laws against consolidation will be overcome by the direct legislation for consolidation.

As a result of the elimination of the proposed transportation board, all regulating authority as far as interstate commerce is concerned will remain centered in the Interstate Commerce Commission, which will be enlarged by the addition of two additional members, making a total of 11, and their duties and powers will be greatly increased by the bill. As there has been a vacancy in the commission since January 1, 1919, this will require the appointment of three new commissioners. In addition to the enlarged functions of the interstate commission provided for in the sections of the bill relating to rates, regulation of security issues and of car service, it will also be given a considerable measure of control over the action of state commissions by the enactment into law of the principles of the Shreveport decision. The conference report will contain the provision for joint hearings by the state and interstate commissions in cases involving a conflict of state and interstate rates and in case of disagreement the federal commission is given power to set aside a state rate which is found to be unduly discriminatory against interstate commerce, or to make such orders as may be necessary to remove an undue discrimination or preference against interstate commerce. Carriers were also given the right to

challenge a state rate for discrimination by filing a complaint with the Interstate Commerce Commission, with the consent of the commission. Also one of the final acts of the conferees was a decision that in addition to the provision that existing rates shall remain in effect until changed by competent authority, existing rates put into effect by the director general may not be changed except by the Interstate Commerce Commission during the six months guarantee period during which the United States is sponsor for the income of the carriers. This is to prevent action by state authorities to reduce the rates made by the Railroad Administration and was directly inspired by the fact that the attention of the conferees was called to an order recently issued by the Illinois Public Utilities Commission suspending, as of the date that the railroads are returned to private management, all rate increases initiated by the director general during the period of federal control.

The conferees were advised on Wednesday, February 4, that the Illinois commission did not actually intend to displace the rates on that date but its order was taken at its face value, as it would automatically have restored the state two-cent fare law and the Illinois commissioners' classification, and was taken as a warning of what might be done in other states.

As has been previously reported the conferees have agreed upon a \$300,000,000 revolving fund from which loans may be made to railroads and also upon a 10-year period for the funding of the indebtedness of the carriers to the government, but there are important differences between the Esch and Cummins bills on this provision on which the terms of the reconciliation have not yet been disclosed. The provisions for a six months' continuation of the guaranty also contain details of vital importance not yet announced. Provision is made, however, by which the Interstate Commerce Commission may recast the accounts so that the guaranty will not cover abnormal expenditures for operation and is authorized to limit the charge to operating expenses for maintenance to the standard provided for in the standard compensation contracts, which is based on the expenditures during the test period equated for increased prices and wages.

It is understood that the conferees have definitely decided to drop the provision in the Esch bill, inserted at the request of the labor organizations, confirming for the future all wage orders of the Railroad Administration until superseded by mutual agreement or by the action of a bi-partisan wage adjustment board. They also eliminated the amendment to the Senate bill offered by Senator Smith of Georgia requiring railroads to secure the approval of the Interstate Commerce Commission before filing a tariff containing an increased rate. They accepted the language of the Senate bill which does not give the Interstate Commerce Commission power to prescribe minimum joint rail and water rates. The House amendment to the Panama canal act to authorize the commission to allow railroads to operate boat lines on the Great Lakes and in coastwise service if found by the commission to be in the public interest, in spite of reduction of competition, was eliminated. The Senate amendment to the long and short haul clause, proposed by Senator Poindexter as a rigid rule but modified to give the Interstate Commerce Commission discretion to allow relief from its strict interpretation, was accepted with a provision that the rate made to meet competition shall be "reasonably compensatory."

The form of the report of the conferees will be a recommendation that the House recede from its disagreement from the Senate amendment to its bill and that it and the Senate agree to the amendments to the Senate bill, which is technically an amendment to the Esch bill, and the conferees will write the new bill. It is expected that the report will be acted upon promptly in both houses and that it will precede the proposed discussion of the peace treaty in the Senate.

Asked for his opinion of the bill as agreed upon, Senator

Cummins said: "It is neither as good nor as bad as it might be."

Alfred P. Thom, counsel for the Association of Railway Executives, has filed with the conference committee a supplemental memorandum making suggestions for points to be considered on various phases of the proposed legislation. He suggested that as a means of making certain that the President is not confined by the federal control act in cases where no compensation contract has been signed, to the 90 per cent of the standard return provided for in the act, the insertion of the following in parenthesis (without the limitation of the 90 per cent imposed by Section 2 of the federal control act).

He also suggested that the President be given authority in his discretion to "compromise" matters in dispute in order to adjust many of the vastly complicated matters within a reasonable time and without endless litigation. Objection was made to the provision in the House bill that the period of federal control shall not be computed as a part of the period of limitation in actions against carriers or in claims for reparation to the commission for causes of action arising prior to federal control.

If the provision of the Senate bill relating to the temporary guaranty to railroads after the termination of federal control is retained, Mr. Thom suggested that the language providing for the expiration of the guaranty when the commission renders its decision as to rates be omitted so that the guaranty may be continued until the rates approved by the commission go into effect.

Regarding the labor provisions, it was suggested that in the public interest it is desirable to localize as much as possible any matter of controversies between employers and employees by providing that all matters of personal discipline arising on the lines of a carrier should, so far as possible, be dealt with on that line and the consequences restricted to that line.

The provisions imposing upon carriers the duty to make disposition of coal cars in accordance with respective requirements of the bills were objected to on the ground that the Interstate Commerce Commission is already fully empowered to deal with this subject and has in many instances promulgated rules and regulations for the guidance of carriers. A memorandum by A. G. Gutheim of the Car Service Section of the Railroad Administration is quoted, in which Mr. Gutheim says there is no particular reason why special legislation should be enacted to protect shippers of coal in the use of a particular equipment which their commodity requires. Mr. Gutheim gives a history of the assigned coal car situation during the past three years and declares that the Cummins bill not only abolishes assigned cars for railroad fuel loading but abolishes the assignment of a private car to its owner's mine for the owner's loading. Regarding the assigned car situation, Mr. Gutheim says:

"During 1917 railroads quite generally were obtaining their fuel coal by assigning cars to mines holding contracts to ship such coal on one or another form of contract. Such mines were then protected in the supply of cars to the extent of their fuel coal contracts even though the regular car distribution was not sufficient to provide a full car supply for all mines.

"When the Fuel Administration began to function it seized upon the assigned car method of protecting railroads as a means of protecting the consignment of coal to certain consumers whose output was deemed essential in the war program. As a result of this, by about December, 1917, when federal control was in sight, so many cars were being assigned for particular railroad and commercial loading that the cars available for ordinary commercial distribution on many railroads were practically nil.

"When the Railroad Administration began to function and the question of renewing the contracts for fuel coal came up,

representatives of the administration, according to the coal operators, flatly announced to the operators that they proposed to use assigned cars for the purpose of getting a better price for railroad fuel. However this may be, there was naturally a considerable protest by coal operators against assigned coal cars, and a determined fight to abolish the practice was begun. This was taken up by the National Coal Association, and about March, 1918, the Fuel Administration also became a proponent of the abolishment of assigned cars for coal loading. The director general of railroads was of opinion that such assigned cars should be continued. An impasse between Messrs. Garfield and McAdoo resulted, and the question was carried to President Wilson, who adopted the Fuel Administration's view, abolished assigned cars, but simultaneously ruled that the government maximum price of coal in all districts should be cut 10 cents per ton.

"It is interesting to note here that the Railroad Administration in their contentions claimed that the assigned car method of loading railroad fuel would save them approximately \$60,000,000 a year. The Fuel Administration was expecting an output of 600,000,000 tons of bituminous in 1918. It may be that this is where the 10 cents per ton figure came from.

"Assigned cars for railroad fuel loading were then abolished. It was appreciated by the Fuel Administration that one result of this might be to embarrass the railroads in obtaining adequate shipments of locomotive fuel. Therefore, it was agreed by the Fuel Administration that railroad fuel supply should be furnished in complete fulfillment of all requirements through the medium of the district representatives of the Fuel Administration in the various coal producing districts, railroad fuel being placed in Class I on the priority list.

"The particular point to bear in mind is that with the abolishment of assigned cars for railroad fuel loading, the government maximum price was cut 10 cents per ton, and there was a positive guarantee of an adequate supply of railroad fuel by a government body in a position to fulfill that guarantee.

"After the Fuel Administration ceased to function in February, 1919, there was for a long while a considerable surplus of coal cars and a slack market for bituminous coal. In consequence, the railroads had no difficulty in obtaining their fuel. With the advent of a car shortage period in July, 1919, however, the Railroad Administration found that it did not have the power of assigned cars in order to obtain its fuel, nor did it have any method of enforcing shipment on railroad fuel contracts, on account of the Fuel Administration having ceased to function, and its district representatives being no longer at work. The result was that many railroads became embarrassed by reason of inadequate fuel supply and there was a constant struggle on many roads to get enough fuel to keep on a safe margin. In a few instances railroads were advised by the Car Service Section not to accept billing of commercial coal from mines holding railroad fuel contracts until the obligations on such contracts had been fully met by those mines. The coal operators individually and through the National Coal Association questioned the legality of this action, taking the position throughout that the Railroad Administration could not utilize assigned cars to obtain railroad fuel, nor could it enforce preferential loading of railroad fuel out of the regular daily distribution of cars.

"This is the situation which the proposed legislation aims to perpetuate. The legislation was requested by the National Coal Association. There are important members of that Association who do not favor this legislation, and who are perfectly willing that the railroads should continue to buy coal on the assigned car basis.

"The legislation proposed is not necessary. There is no reason, after full and complete jurisdiction over car service is given to the Interstate Commerce Commission or the Transportation Board, why the Congress should legislate for the particular benefit of one class of shippers on a question of car service. If the arguments which were presented to the Fuel Administration and to the President in justification of the abolishment of assigned cars in time of war are meritorious in time of peace, the operators have merely to prove that to the Interstate Commerce Commission to obtain a just and reasonable rule for car distribution to coal mines. The commission should not be ousted of this particular phase of car service jurisdiction by particular legislation on the part of Congress.

"However, if this legislation is to stay in the bill, four things are necessary. First, there should be some assurance to the railroads that if they may not get their fuel supply by assigned cars, then preferential shipment of that coal should be guaranteed them by the legislation which abolishes the assigned cars. Second, Congress should not legislate in detail as to the counting of cars and the balancing of distribution on a fourteen-day basis. It is difficult enough now, when the railroads are accounting for car distribution to mines on a monthly basis, to even up in the month period. It would be impossible, with due regard to the interests of the country for coal production, to balance on a fourteen-day period basis, especially during extreme winter weather. Third, there have been instances in the past, and there undoubtedly will come instances in the future, when, in order to protect bunker coal requirements for the Navy, it is necessary to furnish preferential or assigned cars to certain mines, and this may well happen in time other than that of war or threatened war. Some leeway should be given to take care of emergency situations, either for the government or other consumers.

"Further, it is to be observed that the Cummins bill not only abolishes assigned cars for railroad fuel loading but abolishes the assignment of a private car to its owner's mine for the owner's loading. This is a direct confiscation of property rights and inevitably will raise serious questions of compensation to be accorded such private car owners if that is done. It should not be done except in case of dire emergency and the existing provisions of the Cummins bill are sufficient to authorize the regulatory body to take private cars for public use in case of emergency. That is enough, as under ordinary circumstances the private car owner should have his property protected. In the Esch bill an amendment to the original bill was made by inserting on page 47, lines 4 and 5, after the word "ownership," the words "as between carriers." The effect of this legislation is to permit the regulatory body to take care of emergencies by disregarding car ownership when the cars are those of common carrier railroads, but not when the cars are privately owned. It would be advisable to take out these words which have been inserted in the Esch bill, and, if necessary to protect the private car owner, the definition of what constitutes an emergency in which private cars might be used for the general benefit of the public could be made more rigid and the regulatory body's action thereby more restricted.

"If elimination is not possible, then the provision of the Esch bill referred to above should be adopted in preference to that of the Cummins bill. The provision of the Esch bill is practically declaratory of the existing law, while the provision of the Cummins bill goes far beyond existing law."

Mr. Thom also proposed the insertion of a provision that officers and agents whose duty it is to collect charges for transportation service shall be charged with the duty of collecting such charges within 24 hours after receipt by the shipper or consignee of the bill for such charges, except that credit may be extended for 48 hours after receipt in cases

where a surety bond satisfactory to the carrier is given. The purpose of the foregoing, he says, is by force of the statute to do away with the extensive credits which are being demanded of the carriers by some of their patrons. A rule similar to this has been put into effect during federal control and has been found to work most admirably. Mr. Thom says it has resulted in a large decrease in the amount of money uncollected, estimated for all roads to be \$112,000,000.

Because of the public importance of a rail and water line through the Great Lakes, Mr. Thom suggested either that the Panama canal act be confined to the Panama canal or that an exception be made of the Great Lakes. The conferees on Wednesday decided to reject the House amendment to the Panama canal act, thereby making no change in the existing law on the subject.

The Citizens' National Railroads League, of which Nathan L. Amster of Boston is president, filed a memorial with the conferees replying particularly to the memoranda filed by the National Shippers' Conference and the Association of Railway Executives, which, it is stated, "bear every evidence of being inspired by motives other than those of seeking to attain railroad legislation that will accomplish the greatest good for the greatest number." It is declared that the Association of Railway Executives in many respects does not properly represent either the view of the majority of railroad executives or the interest of the majority of the railroad security holders and that that of the so-called shippers' conference does not clearly represent the sentiment of, and is contrary to, the opinion and recommendations of a great majority of American shipping and commercial interests. It is urged that the railroad legislation should provide for ample and sufficient revenue to yield at least 6 per cent on the value of the properties in public service, that the full indebtedness of the railroads to the government should be funded for a period of 10 or 15 years and that the government should provide a revolving fund of \$1,000,000,000 for loans to the railroads at low interest rates to preclude the necessity of their having to go to the "old Wall Street interests" for their financing.

Distribution of Rails Commandeered and Ordered for Railroad Administration

THE DISTRIBUTION between railroads of the 73,500 tons of open hearth rail commandeered for the Railroad Administration by the War Department, as reported in last week's issue, is as follows:

Bangor & Aroostook.....	250 tons
Chicago, Indianapolis & Louisville.....	500 tons
Cleveland, Cincinnati, Chicago & St. Louis.....	2,000 tons
Detroit, Toledo & Ironton.....	1,000 tons
Erie.....	2,000 tons
Grand Trunk Western.....	500 tons
Hocking Valley.....	500 tons
Lake Erie & Western.....	1,000 tons
Michigan Central.....	1,000 tons
New York, Chicago & St. Louis.....	1,500 tons
New York, New Haven & Hartford.....	4,000 tons
Toledo & Ohio Central.....	500 tons
Toledo, St. Louis & Western.....	1,000 tons
Wabash System.....	2,000 tons
Total Eastern Region.....	17,750 tons
Baltimore & Ohio.....	6,000 tons
Bessemer & Lake Erie.....	500 tons
Central of New Jersey.....	1,000 tons
Grand Rapids & Indiana.....	500 tons
Pennsylvania Eastern Lines.....	20,000 tons
Philadelphia & Reading.....	1,500 tons
Western Maryland.....	5,000 tons
Total Allegheny Region.....	30,000 tons
Chesapeake & Ohio.....	1,000 tons
Norfolk & Western.....	4,000 tons
Virginian.....	1,000 tons
Total Pocahontas Region.....	6,000 tons

Atlanta, Birmingham & Atlantic.....	500 tons
Carolina, Clinchfield & Ohio.....	700 tons
Charleston & Western Carolina.....	500 tons
Cincinnati, New Orleans & Texas Pacific.....	500 tons
Gulf, Mobile & Northern.....	500 tons
Louisville & Nashville.....	2,000 tons
Louisville, Henderson & St. Louis.....	500 tons
Mobile & Ohio.....	1,000 tons
Nashville, Chattanooga & St. Louis.....	1,000 tons
Norfolk Southern.....	500 tons
Richmond, Fredericksburg & Potomac.....	700 tons

Total Southern Region..... 8,400 tons

Gulf Coast Lines.....	1,000 tons
Kansas City Southern.....	1,000 tons
Missouri Pacific.....	2,000 tons

Total Southwestern Region..... 4,000 tons

Chicago & Alton.....	1,000 tons
Chicago, Rock Island & Pacific.....	5,000 tons
Kansas City Terminal.....	1,000 tons

Total Central Western Region..... 7,000 tons

Chicago Heights Terminal.....	100 tons
Minneapolis & St. Louis.....	250 tons

Total Northwestern Region..... 350 tons

The division of the commandeering orders as reported in last week's issue was slightly incorrect, or has since been revised, and is as follows:

Illinois Steel Company.....	11,350 tons
Carnegie Steel Company.....	13,500 tons
Tennessee Coal, Iron & Railroad Company.....	12,200 tons
Bethlehem Steel Company.....	10,450 tons
Midvale Steel & Ordnance Company.....	26,000 tons

Orders also have been placed amounting to 44,000 instead of 42,500 as previously reported, including 27,000 to the Illinois Steel Company, which will roll 2,000 tons for the Chesapeake & Ohio, 5,000 for the Baltimore & Ohio, 5,000 for the Chicago, Rock Island & Pacific, 10,000 for the Pennsylvania Western Lines, and 5,000 for the New York Central. The Colorado Fuel & Iron Company will furnish 2,500 tons for the El Paso & Southwestern and the Lackawanna Steel Company will furnish 14,500 for the Erie, New York Central and Delaware, Lackawanna & Western. This makes a total of 117,500 tons ordered since the first of the year.

Mr. Hines Explains Rail Orders

DIRECTOR GENERAL HINES on January 30 authorized the following statement regarding the commandeering of rails by the War Department, as reported in last week's issue:

"An erroneous impression has been created by publications regarding the action of the Railroad Administration in arranging to secure steel rail to meet its urgent needs. The Railroad Administration urgently needs approximately 120,000 tons of steel rail which it ascertained should be rolled in about three weeks. It is essential that this rail be secured as promptly as possible.

"The Railroad Administration has been seeking since October to secure sufficient rail, but has found it impossible to do so largely because of conditions arising out of the recent steel strike.

"In view of the urgency of the situation commandeering orders for a part of the needed rail have been issued on the request of the Railroad Administration. The price to be paid to some mills for rail delivered under these orders has been agreed upon at \$47 a ton, and as to others a reasonable price will be fixed in accordance with the provisions of the statute."

Apparently Mr. Hines wished to correct the impression given by several newspaper stories that the rails were commandeered because of a controversy as to price, instead of as to delivery. The Midvale company has persistently demanded \$57 a ton, but the companies that voluntarily accepted orders took them at \$47.

THE SCHOOL TEACHER.—Men who train minds are not so well paid as the men who mind the trains.—J. G. Schurman.

Farmers Declare for Return of Railroads

Executive Heads of Six National Organizations Urge Congress
to Take Prompt Action

THE EXECUTIVE HEADS of six large national farmers' organizations, at a conference at the headquarters of the National Board of Farm Organizations at Washington on January 30, took issue with the statements that have been reiterated in season and out of season by George P. Hampton and Benjamin C. Marsh, of the Farmers' National Council, that the farmers of the country are for continued government operation of the railroads. In a joint memorial which was sent to all members of Congress, the heads of the six organizations declared that the farmers of the United States are emphatically opposed to government ownership or continued government operation of railroads and desire the expedition of legislation providing for their return to private management.

The memorial adopted by the conference restated the positions taken by the various organizations as adopted at their recent annual meetings and expressed the belief that their "convictions are shared by a vast majority of the farmers of the country." The declaration as to railroads was one of a series, in which it was asserted that farmers are continuing their best efforts to maintain production and demand that labor and capital shall "earnestly and consistently speed up their part of the production so urgently needed." "We have reached the critical point in regard to shorter hours of labor," the memorial declares, "and a 44-hour week will neither feed nor clothe the world." The right to cease work, for adequate reasons, is declared to be unassailable, but "no right exists to compel men to strike or to prevent others from working."

Regarding railroads the memorial said:

"Ownership of Railroads. The government ownership or continued operation of railroads is most emphatically opposed. It is against good public policy and the principles of sound Americanism. We are convinced that any possible emergency calling for such operation has passed; that its continuance is costly, inefficient and inadvisable. We urge Congress to expedite the enactment of legislation providing for the proper reorganization, re-equipment and control of the railroads under private ownership; that this legislation be as plain as possible and providing as few restrictions and complications as will properly protect the superior interest of the public in the operation of railroads. We are opposed to a government guarantee of dividends or a government subsidy."

The memorial was drafted by the following executives: W. U. Drummond of Oklahoma, chairman of the board of governors of the International Farm Congress; J. R. Howard of Iowa, president American Farm Bureau Federation; T. A. Atkeson, Washington representative of the National Grange; R. F. Bower, National Farmers' Union; O. G. Smith, president Farmers' National Congress, and John D. Miller, National Milk Producers' Federation. Other organizations represented at the conference were the State Farm Bureau Federations of Indiana, Vermont, New Jersey and West Virginia; the State Granges of Maryland, Massachusetts, Delaware and New Jersey; the American Cotton Association, the Farmers' Union of Oklahoma, Washington and Virginia, and the Dairymen's League of New York. The memorial was unanimously adopted and was signed by every person participating in the conference.

Mr. Marsh or Mr. Hampton, or both, of the Farmers' National Council, have been very vociferous in Washington in declaring that the farmers are unanimously for government ownership or for a two-year extension of federal control. They have appeared at hearings before Congressional

committees considering railroad legislation, they have demanded special hearings, they have issued many statements to the press and they have left letters at the White House which have been given to the press as having been presented to the President. While claiming to represent farmers, and it is understood that they do represent some of the more radical of the farmers' organizations because they frequently present letters from them, on several recent occasions they have appeared in connection with groups of labor leaders and have assumed to speak for both labor and the farmers. On the day of the conference at which the memorial was drafted Mr. Marsh was quoted in the newspapers as having testified before the Senate Committee on Commerce that Wall Street controls the policies of the National Grange and other national farmers' organizations other than his own.

George F. Hampton, managing director of the Farmers' National Council, has sent a letter to the President of the Senate, the Speaker of the House and the chairman of the Senate and House committees on interstate commerce, attacking the memorial filed by the officers of the six farmers' organizations and claiming that they do not represent the sentiment of the farmers. Mr. Hampton called attention to the statement in the memorial opposing a government guaranty of dividends or a government subsidy and says that "these gentlemen must now be busy fighting the return of the roads since the pending legislation for their return provides for a guaranty." Mr. Hampton overlooks the fact that the return of the roads has been provided for without legislation by the proclamation of the President and that the pending legislation when passed probably will not provide for a guaranty.

E. A. Calvin, Washington representative of the Association of State Farmers' Union Presidents, has also sent to members of Congress a letter to show that farmers' organizations are opposed to government ownership and operation. The letter is in part as follows:

"As considerable is being said in the press and elsewhere to the effect that delegations of farmers have recently visited Washington, demanding that the government retain control of the railroads for at least two years, and stating that this is the wish of the farmers of this country, I feel it to be my duty as a representative of the farmers to set forth their views on this question and to transmit to you resolutions which were adopted by different farm organizations representing the actual American farmers.

"At the annual meeting of the Oklahoma division of the Farmers' Educational and Co-operative Union of America, held on August 19 and 20, 1919, the following resolution was unanimously adopted:

"We view with alarm and oppose the government ownership of railroads, and especially the Plumb plan, of the government buying the railroads at public expense, turning them over to the railroad employees, and guaranteeing the railroad employees whatever wages they demand and a division of the profits. If Congress in its wisdom does this, we ask them to also buy all of our farms and their equipment, hire the farmers to operate them at two-thirds of the hourly wage scale paid the average railroad employee, and sell the production to the consumer at cost."

"This about expresses the views of an overwhelming majority of the farmers of the nation, who are members of the Farmers' Union and other farm organizations in the several states, including Louisiana, Alabama, Ohio, Texas, Illinois

and Iowa, which organizations adopted similar resolutions opposing government ownership.

"At the annual meeting of the American Farm Bureau Federation, held in Chicago, November 14 last, the following resolution was adopted:

"We are opposed to government ownership of public utilities. We demand the early return of the railroads to private control, under such conditions and regulations as will render adequate service at just and equitable rates. We particularly demand immediate attention to restoring the efficiency of livestock and other perishable transportation, both in car equipment and train schedules."

"If there is any class of our citizens who have suffered from inefficient railroad service and delay in transportation in the last two or three years it is the farmers; and you can take it as a fact, if we are to believe what they say in their resolutions, that a majority of the farmers of this nation desire the return of the railroads to their owners at the earliest possible moment, and we consider the President's announcement that they shall be returned on March 1 as sound in principle and highly expedient under existing conditions."

"At the fifty-third annual session of the National Grange at Detroit, Mich., November 18, 1919, the following resolution was adopted:

"While recognizing the evils of uncurbed power growing

from swollen fortunes in the hands of unscrupulous and ambitious individuals, the National Grange declares that in a government of a free democracy is lodged ample power to curb all such evils. We declare our opposition to government ownership and to nationalization of business and industry. We favor the safeguarding and protection of private property as only by the full development of the right of private property can there be perpetuated the full measure of individual initiative and emulation upon which a democracy is based and by which its future is assured."

"All fair-minded people will readily agree that the above is sound in principle and in harmony with our democratic form of government. The experience of the last three years of the government's endeavoring to engage in operating and conducting different lines of business has demonstrated the folly of nationalizing business under control of the federal government by commissions or licenses, and the fact has been asserted and has not been denied that when the government endeavored to produce castor oil those in charge of this industry for the government succeeded in producing only two quarts at a cost of several million dollars. I feel safe in asserting that if this task had been left to the common-sense farmers of Iowa, Missouri, Kansas and Oklahoma, where castor oil beans are grown, that the government would have received an abundance of castor oil at a minimum cost."

A New Report on the Salaries of Technical Men

Engineering Council's Committee on Classification and Compensation Submits Its Findings

A NEW IMPETUS has been given to discussions of the adequacy of engineers' salaries by the report recently submitted to Engineering Council by its Committee on Classification and Compensation of Engineers. At the meeting of Engineering Council on December 18, 1919, this report was received and the classification for engineers in railroad, municipal and federal, state, county service embodied in this report was adopted. This classification has been made sufficiently general to cover all branches of engineering service. As a consequence its nomenclature as applied to any particular class, such as railway engineering, is not specific. On the other hand, the body of the report contains some very pertinent observations on the present status of the engineer, although the specific examples cited concern governmental or municipal work rather than the railroads. The following are excerpts taken from such portions of this report as would be of greatest interest to railway men.

Findings and Conclusions of the Committee

The investigations have shown the lack of any adequate or consistent employment policy with respect to professional engineers. This is evidenced by the following conditions which are believed to be largely responsible for the unsatisfactory status of men engaged in this class of work:

1. Absence of any uniform system of grading of positions.
2. Lack of uniformity in titles of positions with respect to duties.
3. Inequalities in compensation for positions of the same grade.
4. Generally inadequate compensation for services rendered.

To the end that these conditions may be corrected and proper and equitable conditions of employment established, the following principles and practices are recommended by

the committee, though not yet acted upon by the Council.

1. Positions should be classified in accordance with the type of work, and with the character of the duties to be performed and the qualifications necessary for their performance, as indicated by a system of grading.
2. Within the salary limits fixed for each grade, there should be a system of advancement through the grade based upon experience gained in the position and upon proof of increase in the proficiency of the employee in performing the duties of the grade.
3. Promotions from grade to grade should depend upon the existence of a vacancy in the higher grade and proof that the employee is qualified to fill the vacancy.
4. The determination of salary adequate to procure for and retain in engineering work a high class of employees, should take into account and properly weigh the following considerations:
 - (a) The capital invested, both in money and in time, in obtaining the requisite fundamental training.
 - (b) The amount and character of experience and the degree of personal ability required.
 - (c) The relative value of the classes of work to be performed.
 - (d) The amount paid for similar service in other lines of work.
 - (e) The amount necessary to enable the employee to maintain a standard of living commensurate with the general standards of the community for positions of similar dignity and responsibility.
5. In the interest of an adequate social policy, no position likely to be occupied by individuals of an age to assume family responsibilities should fail to pay an amount sufficient to permit the maintenance of the average family in reasonable decency and comfort.
6. In the interest of the employees as a whole and of the employer, a system should be established by which employees

who fail to maintain satisfactory standards of service should be removed, transferred, demoted, or retired as may be equitable in the circumstances.

Classification of Engineering Positions

The grades proposed, which appear to be well adapted to use not only in all of the services represented but also for all other forms of engineering activities, have been divided into two classes: Professional service, which is deemed to include men who have received an engineering degree from an educational institution of recognized standing or who have obtained similar qualifications through practice of the profession and by mastering the fundamentals of engineering science, and sub-professional service, which includes assistants with at least a high school education, who enter upon the practice of the profession in the performance of responsible duties for which an engineering training is not essential, but who through experience and study may fit themselves for the higher grades. The classification with the minimum experience requirement for the various grades, is as follows:

		Experience in years	
		With degree in engineering	Without degree in engineering
Professional service			
Grade 1—Chief engineer	12	16	
Grade 2—Engineer	8	12	
Grade 3—Senior assistant engineer	5	9	
Grade 4—Assistant engineer	2	6	
Grade 5—Junior assistant engineer	0	4	
Sub-professional service			
Grade 6—Senior aid, office	0	5	5
Grade 6—Senior aid, field	0	5	5
Grade 7—Aid, office	0	2	2
Grade 7—Aid, field	0	2	2
Grade 8—Junior aid, office	0	0	0
Grade 8—Junior aid, field	0	0	0

The application of these classes to railway engineering is illustrated by the assignment of the following descriptive terms used in railroad parlance to these various classes:

1. Chief Engineer—chief engineer of maintenance of way.
2. Engineer—electrical engineer, mechanical engineer, bridge engineer, tunnel engineer, maintenance of way engineer, signal engineer, division engineer, district engineer, structural engineer, valuation engineer, designing engineer, etc.
3. Senior Assistant Engineer—senior assistant electrical engineer, senior assistant mechanical engineer, senior assistant bridge engineer, etc.
4. Assistant Engineer—similar to senior assistant engineer.
5. Junior Assistant Engineer—engineer inspector, etc.
6. Senior Aid—chief draftsman, chief computer and chief inspector.
7. Aid—draftsman, computer, instrumentman and inspector.
8. Junior Aid—junior draftsman, tracer, rodman and tapman.

Striking Comparison with Results

of Earlier Investigation

In 1913, a committee was appointed by the board of direction of the American Society of Civil Engineers to investigate the conditions of employment and compensation of civil engineers. This committee was headed by the late Alfred Noble, who was succeeded as chairman by Nelson P. Lewis. In his final report, presented at the annual meeting of the society held in 1917, the committee gave the results of its canvasses, comprising returns from 6,378 engineers, of whom 1,319 were non-members.

The committee advised that the analysis of the returns showed that the pay received by members of the society was generally about 25 per cent above that of non-members. It also reported that from the meager information obtained it was "convinced that the compensation for engineering work compares favorably with that received by men of any other profession," and that there was need for "better trained engineers rather than of more engineers."

That a radical change of heart has since taken place on the part of responsible department heads is clearly evidenced. It also appears that the respondents in the case of the previous investigation were largely confined to the classes receiving maximum compensation.

A comparison with the pay of the industrial worker who serves under the engineer also bears testimony to the fact that, while admitted by none as to value, the actual compen-

sation for brawn is to-day greater than for engineering brain. The need for setting up some scale of compensation for the engineer to correct this serious condition is, therefore, obvious, as is also that for the inquiry now being carried on by the committee. Unless a radical improvement can be brought about, it seems evident that the profession cannot attract to or retain in it men of the caliber required to command the respect in which it has heretofore been held by the public, and that so long as they are continuously struggling with the problem of making even a bare living, their efficiency will be minimized and their incentive to work with other than a purely selfish interest will be lacking.

The committee is impressed with the method which has been followed by the federal section in setting up a standard of compensation based on a readjustment to the new conditions as to cost of living, this being dependent on an award made on October 24, 1918, by the Shipping Wage Adjustment Board, which was designed to provide a uniform national wage scale for all shipbuilding workers, including a scale of compensation for draftsmen and copyists. A further comparison has also been made with scales proposed by other organizations, which seems to justify the schedule of salaries now suggested by the committee for discussion, which is as follows:

SCHEDULE OF SALARIES SUGGESTED FOR DISCUSSION

Grade	Total Experience years to qualify		Salary Range	
	required with pro- fessional Degree	without pro- fessional Degree		
8—Junior aid	0	0	\$1,080	\$1,560
7—Aid	2	2	1,680	2,400
6—Senior aid	5	5	2,520	3,240
5—Junior assistant engineer	0	4	1,620	2,580
4—Assistant engineer	2	6	2,700	4,140
3—Senior assistant engineer	5	9	4,320	5,760
2—Engineer	8	12	5,940	No limit
1—Chief engineer	12	16	8,100	No limit

The committee is not prepared at this time to recommend the adoption of any definite schedule of compensation, and it is not at all clear as to the wisdom of fixing even a minimum limit on the highest grades of service or of keeping the maximum of one grade below the minimum of the grade above, all of which questions are now receiving its serious consideration, as is also the question concerning the provision to be made for advancing within the limits of a grade, for which a plan is suggested by its federal section. It would seem to the committee that, pending the completion of the investigation, the scale of compensation herein presented and the plan for promotion within a grade is adapted to general use in all branches of engineering service. The committee believes, however, that a general discussion of this question is desirable.

The committee responsible for this report consists of 11 members arranged in groups in a major committee and in railroad, state, municipal and federal sections. The personnel of the railroad section includes: Francis Lee Stuart, chairman, consulting engineer, New York City; Frank H. Clark, consulting engineer, New York City and Bion J. Arnold, consulting engineer, Chicago.

LOCOMOTIVE RUNNING is not so fatal as in some quarters it is supposed to be. At Sparkill, N. Y., on the west shore of the Hudson river, Cassie Mabie, a retired engineman of the Erie Railroad, who flourished in the nineteenth century, is still living, at the age of 103 years. This we have on the authority of the Erie Railroad Magazine. Sparkill, evidently, is a healthy location. But, as a promoter of longevity, the Sparkill climate has its limitations, for in the same magazine is a notice of Garret Iseman, another veteran engineman of the Erie, who died in Sparkill on the 8th of December at the age of 96. Iseman was promoted from fireman to engineer in the year 1847, when James K. Polk was president of the United States. In the early eighties he ran the Chicago express between Jersey City and Port Jervis.

Work of the Division of Law

THE ANNUAL REPORT of the Division of Law of the Railroad Administration to Director General Hines, by E. Marvin Underwood, general counsel, which was abstracted in the *Railway Age* of January 30, states that whereas the last annual report of the division shows that approximately 1,000 cases were then pending on the docket of the Interstate Commerce Commission, on January 1, 1920, there were pending on the commission's former docket 907 complaints against the director general and carriers under federal control. During 1919, 832 formal complaints were filed and notice thereof served upon a representative of the division acting as statutory agent for the director general. During the year 892 hearings have been held in different parts of the country and 151 cases have been argued and submitted to the Interstate Commerce Commission, many of which involve important rate adjustments in every part of the country. In addition to the general supervision over the work of the attorneys for various railroads 30 cases have been tried, briefed and argued by attorneys connected with the Central Administration. The report also contains the following regarding claims for transportation charges in dispute with the War Department and claims for consideration pending before the claims board.

"The War Department has questioned a number of bills rendered by the Railroad Administration covering freight and passenger charges on the ground that the rates were unreasonable or illegal. There have been prepared and filed a great many appeals to the comptroller of the treasury from the ruling of the auditor of the war department. The comptroller of the treasury has held in several cases that these bills, involving a substantial amount of revenue, should not be paid as rendered.

"Early in the war the railroads of the country were called upon by the War Department to do a vast amount of construction work in connection with military camps located throughout the country, such as additional trackage, grading, construction of side tracks, and railroad facilities of almost every kind. With few exceptions this work was not covered by formal contract. In many instances the work was authorized by a letter written by an officer of the war department in charge of the work at the camp, and in others there were oral agreements.

"Effective March 2, 1919, an act was passed granting authority to the Secretary of War to audit and pay the claims of those who had performed work for the war department under contracts either express or implied. This act applied to all claims arising prior to November 12, 1918, and required that they be filed prior to June 30, 1919. The Secretary of War organized a board known as the War Claims Board for the purpose of passing upon all claims of this character. The War Claims Board in turn organized a subordinate board known as the Claims Board, Transportation Service, War Department. The latter was charged with the duty of examining and passing upon claims filed by railroad companies or the Railroad Administration covering the class of construction work to which the act applied. Under instructions from the director of the Division of Capital Expenditures the various federal auditors filed their claims with the Claims Board in accordance with the instructions issued by the Claims Board, which instructions were supplemented by A. H. Plant, chairman of the accounting section of the Association of Railroad Accounting Officers. Presentation of these claims to the board was made by this division. The board has heard a number of claims presented by the Southern Railroad, by the Pennsylvania Railroad and the Chicago, Burlington & Quincy Railroad. The claims filed with this board aggregate approximately \$15,543,593.81. It is believed that the matters are proceeding satisfactorily and that the Claims Board will soon be in a position to make definite reports upon a number of claims.

Need of Strong Men in Railroad Service*

THE COUNTRY is thoroughly sick of government operation of our railroads, not alone because the quality of the service has fallen off, but because there is an evident deterioration in morale and efficiency. In December, 1919, the railroads were handling less business than they did in July, 1917, yet they are now employing 200,000 more men to handle the smaller amount of business than were employed under private management for a larger business.

The return of the railroads to private management on March 1 will be of supreme importance in enabling the companies once again to restore esprit de corps. During the last two years many of the ablest and most promising young men in the railroad business have gone into other and more profitable lines. From one large railway a considerable number of civil engineers in 1917 went into the army as officers in the engineering corps, and not one of these men has returned to the railroad business.

The attacks upon the men to whom the railroads pay substantial salaries and the hampering restrictions of regulating bodies make the young men feel that the railroad business offers no chance for the display of brains. Enormous capital is necessary to do the railroad business, but to be economically administered it must continue to attract the very best type of American brains.

To bring that about it is essential that the American people understand the unique contribution to the welfare of the country made by an efficient railroad officer.

It is important that the people should manifest their belief that in the most honorable and attractive of American businesses adequate rewards should be made available to men capable of administering railroad property economically and in the public interest.

The supreme need is the restoration of public faith in those who run our railroads. We have a new generation of railroad managers in office today—most of them men of high patriotism and imbued with a sense of fidelity to public interest. It is high time that we stop giving so much attention to criticisms of railroad abuses in the past, and while making impossible similar abuses in the future concentrate our attention on supporting with our faith and our praise the railroad men on whom we must depend for our commercial facilities.

No great railroad improvements are being projected today, yet commerce is going forward at an amazing pace. Railroad facilities do not come into being over night. They must be planned years in advance, and unless our commerce is to be absolutely throttled we must take effective steps immediately to catch up as best we can with what has been lost in the stagnation of railway development during recent years.

The country is growing by leaps and bounds, with opportunities for commercial advancement undreamed of, yet we find ourselves on the threshold of return to private ownership with our railroad business—equipment, personnel and plans for the future—in a condition of virtual sterility and stagnation. Nothing is more vital at this moment than that the people make their Congress understand that public sentiment is strongly behind the movement for constructive railroad legislation.

The Utah Manufacturers' Association has telegraphed to Utah congressmen urging the retention of the anti-strike clauses in the proposed railroad legislation. The association, representing 200 manufacturers, believes that public servants should be prohibited from demoralizing the industries of the country by concerted action.

*From an address by Ivy L. Lee, before the People's Institute, Cooper Union, New York City, January 27.

Application of Automatic Signals and Train Stops*

Preventable Collisions Emphasize Necessity of Automatic Train Control as Adjunct to Visual Signals

By C. C. Anthony

Consulting Signal Engineer, Santa Rosa, California

IT IS FROM THE POINT of view of blocking that the automatic signal interests the operating man. Of course, block signaling or block operation can be carried on without automatic signals, by purely manual signals, and it is carried on in this way over a large mileage of road in this country and to a great extent in England.

The block system itself is a perfectly simple provision for preventing collisions between trains moving on the same track, at least this is the fundamental purpose—leaving out of account protection against open switches, broken rails and the like. This is accomplished by dividing the railroad, or each track, if there is more than one track, into sections called “block sections” or, for short, “blocks.” A signal is located at the entrance of any section, and this is so controlled or operated, whether by men or automatic devices, as to indicate “stop” whenever that section is occupied by a train. When the section is no longer occupied the signal will show “Proceed” or “Clear” for that piece of track.

Theoretically the block system should be a perfect protection against collisions; that is, the signal at the entrance of any given block should always indicate “Stop” when the block is occupied, and if every train that approached such a signal stopped, we could not possibly have a collision. But familiar facts show that this is not always true. The block system is not a perfect protection against collisions; and there are two reasons. One is that the signals, however they are operated, are not infallible and they occasionally go wrong, showing an indication corresponding to a clear piece of track when the track is occupied; and, on the other hand, the men who run the trains do not invariably stop when a signal indicates “Stop.”

There are two classes of signal failures. One class is that in which the signals indicate “Stop,” when there is no occasion for stopping, as the track is clear—this is a safe situation, a failure on the safe side. It may stop a train unnecessarily, but it would not directly lead to an accident, and so we commonly call these failures “safe failures.” In all well-managed block systems these are the more frequent failures. But in spite of all care a signal will occasionally indicate “Clear,” or “Proceed,” when the track is occupied. However, the records show such failures to be extremely rare. I think it is generally conceded that a good record is one such failure in a million operations of any given signal; and in some cases it is much better than that. For instance, on the subway lines about New York the records are far above that. For one whole year on the Hudson & Manhattan subways, which pass under the Hudson river, with an enormous traffic, not a single failure of that kind was reported. On the other hand, the record shows that the failures of the men are rather numerous. The engineman for one reason or other occasionally fails to act properly upon the indication of a signal.

When an accident occurs which a signal ought to have prevented there are three possible conditions which may have contributed to it. (1) A signal may have failed and given a wrong indication, which led to the accident. (2) The engineman may have failed to take the proper action

when the signal gave the right indication, and (3) There may be doubt as to which of these two things entered into the affair.

These cases of doubt are, of course, the most troublesome ones to everybody concerned. Occasionally they are cleared up by some fortunate circumstance in the way of a witness—some employee of the road happened to be on the spot and saw the indication of the signal when the train passed it. I have known of more than one case of that kind; and it is a great relief to have the case settled in some such way. But there remain a great many cases in which it is impossible to prove absolutely where the fault lay. The only thing to be done then is to make a most thorough inspection and test of all the apparatus concerned, and, as is often done, to place men day and night to watch the operation of the particular signal for rather a long period, in order to find out whether there is anything to indicate a possibility of a false-clear failure. The final result is usually to arrive at a reasonable probability. If it is found to be reasonably probable that the signal was working properly, then there is nothing left but to lay the blame on the engineman. For the rest of his life the engineman may feel that he is unjustly treated in having to bear the blame for the accident. Probably in every case where the engineman survives such an accident, he says he is sure he had a clear signal; and I don't doubt that in most cases he is perfectly honest about it. The chances are he would not have gone ahead and gotten into trouble deliberately if he had recognized that he had a “Stop” signal. For a good many years all the important accidents on our American railroads have been investigated by inspectors employed by the Interstate Commerce Commission; and they are supposedly unprejudiced people. Time and again, as I have noticed in their reports, they have, after making thorough tests and going into the case as completely as possible, been forced to the conclusion that the signal must have been working properly and that the engineman was the man to blame.

Taking the false-clear failures of the signal: All those that are recorded are extremely few; and even if some cases were added where there is a reasonable probability of such failure, there are still a very small number of failures of that kind. The cases are very much more numerous in which the enginemen are known to have taken the wrong action on the proper signal, and in which there is a reasonable probability that they have done so.

This naturally brings up the question: What is the remedy?

Probably every one would say, “Why not devise something that will work in connection with the signals and automatically stop the train if an engineman fails to take the action he should?”

That brings up the second part of the subject, automatic train stops.

Automatic Train Stops

This question was first asked many years ago; in the years that have gone by the answer has been pretty well worked out. Numerous inventors have been working for years to devise apparatus for that purpose. Many have had very little knowledge of railroad conditions; in many cases

*Abstract of a paper presented before the Pacific Railway Club, San Francisco, November 13, 1919.

their devices have been quite worthless; and again, a man has invented something good that someone else invented a short time before. But through it all, a good many people have worked intelligently and conscientiously on this problem, with the result that at the present time it can be said to be practically solved. There are several devices that are practical and workable at the present time. It would occur to almost anyone that the result could be accomplished by means of a trip placed on the ties at the side of the track, or even overhead, to strike the arm of a valve on the engine and allow the air to escape from the train pipe and apply the air brakes.

One of the first methods in this country was to place a glass tube on the top of the engine cab, connected with the main air pipe or train line, and provide an arm that swung out over the track from the signal when the signal indicated "Stop"; so that, if the engine should pass the stop signal, the arm would break the glass tube, allow the air to escape and apply the brakes. I think the first application of that very simple scheme was on an engine on the Pennsylvania Railroad; and it happened that that engine made trips through the tunnel at the summit of the Allegheny mountains. When winter came on, icicles formed in the tunnel, and one day the tube struck an icicle, broke, and stopped the train in the tunnel. It then became apparent that the glass tube was not very practical for an ordinary railroad—in that sort of a climate at any rate; nevertheless, that very same simple device is in use on an electric line on the coast.

Another simple arrangement—a small arm that swings up when the signal is at "Stop" and opens a valve on the engine or car, is in use in the subways of New York, Philadelphia and Boston, and, to a very limited extent, on the Pennsylvania Railroad—on its line running into New York through tunnels under the Hudson river. A variation of this arrangement consists of a long bar of steel, having a gentle slope upwards from one end and then a level portion, placed on the ends of the ties just outside the rail; a shoe on the engine strikes the incline and, as it is raised, operates whatever may be desirable on the engine. The bar, called a ramp, usually serves also to conduct electric current to the engine device through the shoe. Several systems have employed or propose to employ this arrangement.

But all those devices which involve actual mechanical or physical contact between devices on the roadway and devices on the engine are looked upon by a great many railroad people with some disfavor. The feeling is that, at high speeds, they are likely to receive severe shocks, and be interfered with in the cold parts of the country by ice and snow, or be damaged by things falling off trains or lying on the track. Many people who have looked into this subject feel that they would prefer a device which would be free from the necessity of any contact between devices on the engine and those on the track. This particular branch of the subject is what technically is called "getting on to the engine."

The whole automatic-stop proposition may be divided into three sections: (1) The control, in connection with the signal system or the block system, by which the apparatus may be set in motion whenever conditions require it. (2) The means of "getting on to the engine"; and (3) The means, on the engine itself, of stopping the train.

In the present development of electrical science, it is quite possible to get on to the engine without any physical contact whatever. Everyone is familiar, in a general way, with the action of a magnet. For instance, take a pocket compass and pass a permanent magnet over it and the needle will swing. There is some kind of invisible influence passing through the air, glass and metal from the magnet, producing motion. In the present development that influence, known as "magnetic induction," can be used quite successfully

for the purpose we have in view. It simply means a larger magnet than the one you may have used as a toy, and a suitable device on the engine to be affected by it. Then again there is electro-magnetic induction. It has been known almost as long as there has been any electrical science that an electric current sets up a magnetic effect which will influence an adjacent circuit whenever the current is started and stopped, or changed in strength. That kind of induction has been employed for the purpose.

To win approval an automatic train stop should conform to certain principles. It ought to be reliable and acceptable to experts. One of the most important principles is one that the signal man calls the "closed-circuit principle." In his experience with signaling apparatus he has developed the fact that the operation of a signal to allow a train to proceed should depend upon the flow of current in any electric circuits by which that signal is controlled, the reason being that the most usual failures of electrical apparatus and circuits are due to such things as broken wires or loose connections, or failure of the power or whatever may be provided to furnish the current. If the flow of current is necessary to give a clear signal, any interruption, whether intentional or accidental, will give a stop signal, or cause a safe failure; and it is felt that automatic-stop apparatus should work on the same principle, so that the most probable failures of the apparatus will not be on the dangerous side but will merely result in a train being stopped when it need not be stopped. This is called the closed-circuit principle because originally it referred almost entirely to electric circuits. Now the term has been extended even to devices using compressed air.

The real question now, is *not* "Why should not a device be invented or designed to do this thing?" but, "Why should we not have a device to do it?" In other words, why should it not now be used on the railroads. The devices have been pretty well developed to a practical point and the question now is, "Why aren't they in more extensive use?"

The answer is that all sorts of difficulties are anticipated. I believe that when signals were first introduced on railroads people generally anticipated difficulties. They said: "Why, one of these signals may some day stop a train when there is no need of stopping it. We cannot stand for such delay. We shall have all kinds of trouble." At one time I put in an entirely new kind of block system on a stretch of single track on the Pennsylvania railroad. The operating people on the ground shook their heads in despair and said, "The day that system goes into service this railroad will be tied up. We shall not be able to move a train through this piece of track." But the day it went into service and forever after we got better service over that particular piece of track than ever before. This same feeling cropped up here and there in connection with the automatic block system. They said, "It will impede traffic; stop trains unnecessarily; interfere with smooth and speedy operation." But the fact has been quite the contrary. It has improved operating conditions on our railroads. And it actually enables more trains to be run over a given track in a given time than could safely be run without it.

When we come to the automatic train stop we find that same old feeling: "We are going to have all kinds of trouble; the device will fail occasionally and stop trains when there is no occasion to stop them"; there will be very great difficulties in meeting practical operating conditions." Having studied the subject somewhat carefully, I may say of this fear what Mark Twain said, as you may remember, when he heard a report of his death: "It is much exaggerated."

I believe the automatic train stop as it is now developed can be applied to railroads, if proper intelligence is used in laying out the locations for the stopping devices, etc., and used in connection with the signal system, so that the

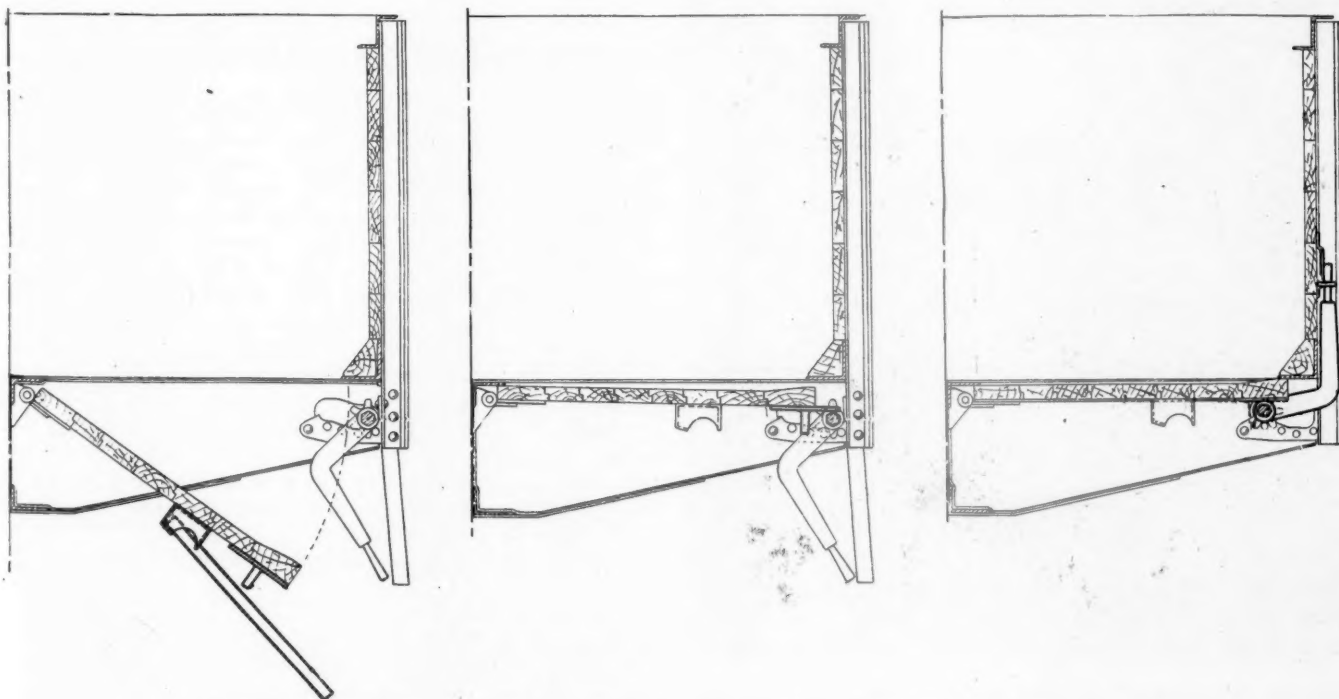
operation of trains will not be seriously interfered with and the safety of operation will be decidedly increased. I think the real feeling of a great many railroad officers is and has been for a number of years that the automatic train stop must come. In effect they say, "We cannot improve the accident record materially; we cannot get the degree of safety we all want without the automatic stop; we must have it sooner or later—and in any event it may be forced by Government action." At the same time there is still a tendency to delay. But I believe that the time has come when those fears should be laid aside; and, in view of the accident record and the earnest desire of everybody connected with railroads to improve the safety of operation, that the time is actually here now when the automatic stop should be applied on a fairly large scale.

Hart-End General Service Car and Hart Door Gear

TO BE OF THE GREATEST VALUE when handling bulky commodities such as coal or road-building materials, the drop doors on general service gondola cars should occupy the maximum possible proportion of the floor area in order that the least amount of shoveling may be necessary to clear the car. Such cars have been built with doors occupying the entire length of the floor on both sides of the center sill. In these designs, however, it has been difficult

self-dumping gondola cars in mind, the National Dump Car Company, Chicago, has developed a design of drop-bottom gondola, known as the Hartend general service car. The purpose of this design is to provide a stiff end construction, incorporating a solid floor plate from the end sill to the bolster at each end of the car, but arranged in such a manner that the load in this part of the car may be dumped at the sides, as it would be through a drop door. The manner in which this has been accomplished is indicated in the illustration showing the end elevation and interior of the car. Between the bolster and end sill at either end the floor plates are sloped downward and outward from the center sill, in effect forming a hopper at each corner of the car. The outer sides of these hoppers are closed by swinging doors hinged at the top and easily closed and locked by hand. This design provides a rigid end construction, provides for the complete discharge of the load with practically no shoveling, and incidentally provides cubical capacity in the corner hoppers for from one and one-half to two tons additional load. A level floor is retained between the bolsters, so that the suitability of the car for loading with lumber, rail, ties or other similar material is unaffected. As the hopper doors are readily operated directly by hand, this design permits the drop door shaft operating mechanism to be placed at the bolster, where it is not exposed to damage from corner blows as it is when located at the ends of the car.

Another feature of recent development which is included in the construction of the car illustrated is a simple door locking and dumping mechanism which may be applied to



Half Sections of the General Service Car Showing the Operation of the Hart Door Gear

to secure sufficient structural strength at the corners to prevent the frame from being distorted from the use of the push pole to such an extent that the doors bind and are not easily operated. This difficulty has resulted in the exclusion of drop doors and the use of a solid floor between the bolsters and end sills on many of these cars. Another difficulty which has discouraged the use of doors beyond the bolsters is the fact that with these doors included the operating mechanism must be placed at the end sills of the car at each corner, where it is usually unprotected from abuse which frequently renders the mechanism inoperative.

With these two objections to the usual design of completely

the doors of any general service gondola car of the usual design.

Generally speaking, door-operating mechanisms are more or less troublesome to maintain in satisfactory operating conditions. Where chains are used to raise the doors they usually offer some obstruction to the movement of material in unloading, and frequent readjustment is required to insure uniformity in closing all of the doors operated by one shaft. In the Hart door gear no attempt has been made to provide for the closing of the doors by the operating mechanism, and all chains or other flexible connections between the doors and the shaft have been eliminated. Each door is closed by

hand and temporarily latched, after which each group of doors is permanently locked as a unit. In unloading, a half turn of the permanent locking shaft releases the whole group.

For closing the doors each is provided on its under side with a metal socket and fulcrum, so arranged that when the end of a short lifting bar is inserted in the socket the bar is held in a position convenient for raising the door. Mounted in short slots formed near the outer ends of the cross members of the underframe is a rolling shaft. When the doors are opened this shaft is moved to the outer ends of the slots close to the side of the car, so that it clears the outer edges of the doors. With the shaft in this position, as each door is raised by means of the lifting lever, a simple sliding latch on the under side of the door is moved out so that it rests on the shaft, thus temporarily securing the door in the closed

of the car, with the operating lever on each locking shaft located at the bolster end of the shaft. To dump all of the doors in each group the link is raised off the end of the shaft-operating lever, which is then turned outward and downward through approximately one-half revolution, thus rolling the shaft out from under the doors and allowing them to drop by gravity.

By referring to the drawings, it is evident that the rack on which the shaft is rolled is given a slight upward inclination toward its inner end that tends to close the doors tightly against the bottom of the car when the shaft is locked. By closing each door individually any dirt or obstruction which might interfere with its proper closure is cleaned off, so that the doors are closed and locked easily without being distorted themselves or putting excessive strains on the locking mechanism. Should they become warped or sprung, however, the slight downward movement of the shaft in its outward travel provides a range of approximately one inch, within which a sprung door offers no difficulty to the operator in temporarily latching it prior to locking the group with the shaft.

A sample car incorporating the end hopper and the Hart door operating mechanism has been in service for several months handling soft coal. In this service it has proved to be self-clearing, and incidentally has demonstrated its advantage in many instances, where cars are being unloaded into wagons on a team truck, of making it possible to dump a small portion of the load at one corner to afford a place for shoveling without dumping an entire quarter of the load.



Interior and End of the Hart-End Car Showing the Side Hoppers at the Ends.

position. When all of the doors in each group have thus been secured they are permanently locked in the closed position by rolling the shaft inward through one-half revolution. For this purpose an operating lever is permanently attached to each shaft. In locking the doors this lever is turned up against the side of the car and locked in position with a sliding link which is dropped over its end. As the shaft travels inward it engages the downwardly projecting lug or handle on the temporary latch and moves the latch back, so that in dumping it offers no obstruction to the dropping of the door.

The drop doors are divided into two groups on each side

1919 Deficit Stated at \$349,000,000

COMPLETE STATISTICS for the earnings and expenses of the railways in December and for the calendar year 1919 are not yet available, but preliminary figures have been compiled and Director General Hines on January 31 authorized a statement estimating the net operating income of the Class I roads and terminal companies for December at about \$12,700,000, which represents a deficit for the month of \$62,300,000 as compared with one-twelfth of the annual rental, and a loss of \$59,800,000 as compared with the average net operating income for December of the test period. After making various readjustments the Railroad Administration's statement places the loss for two years of federal operation, the amount by which the net operating income fell below the guaranteed return, at \$594,200,000 and for the year 1919 at \$349,200,000, which makes the loss for 1918, \$245,000,000. On this basis the net operating income for 1919 would be about \$551,000,000 and that for 1918 would become \$655,000,000, as compared with \$974,000,000 in 1917.

This covers railway operations alone; it is understood that the expenses of the Railroad Administration, which are not included in the monthly reports, and its outside operations, such as Pullman car lines, waterways and express, will show an additional loss of about \$100,000,000 for the two years. Mr. Hines' statement attributes the unfavorable showing for November and December mainly to the effects of the coal strike on both earnings and expenses. He does not, however, show either the earnings or the expenses for December and his usual monthly statement showing the final figures for November has not yet been given out, although a statement giving the preliminary figures was made public. He says that the loss for the two months, \$111,500,000, was practically all due to the strike and that if it had not been for the strike and if Mr. McAdoo had made his general rate advance effective about six months sooner than he did the railroads would have about earned their guaranty for two years.

It might also be stated that if Mr. Hines had put into

effect on January 1, 1919, the increase in rates which the railroads are preparing to ask of the Interstate Commerce Commission there might not have been a deficit of \$349,000,000 for 1919. It is probably just as well for the reputation of railroad men generally, and particularly for those in the central office of the Railroad Administration, that Mr. McAdoo did not have \$494,000,000 additional revenue in 1918, because that would have produced a surplus of \$249,000,000 for Mr. Adoo in 1918 and would not have reduced Mr. Hines' deficit of \$349,000,000 in 1919, which would undoubtedly have led to some comparisons much more invidious than those which have resulted from contrasting the net operating income for 1918 and 1919 with that for 1915, 1916 and 1917.

As compared with December, 1918, the volume of traffic in December, 1919, shows little change as a result of the coal strike, but the effect is shown by the sudden drop from the peak of October. The net ton miles of revenue and non-revenue freight fell of 0.5 per cent, as compared with December, 1918. The Central district of the Eastern region shows a reduction of 5.7 per cent, but the Eastern region as a whole shows an increase of 2 per cent. The Allegheny region, which was particularly affected by the strike, shows a reduction of 7.1 per cent and the North Western region a reduction of 12.5 per cent.

As compared with October, however, the net ton miles per mile of road per day showed a reduction much more marked than in either 1918 or 1917. In October, 1919, the average was 5,625. This fell off to 4,711 in November and 4,685 in December, whereas in 1918 the reduction was from 5,584 in October to 5,155 in November and 4,716 in December, and in 1917 the reduction was from 5,385 in October to 5,298 in November and 4,489 in December.

For the calendar year 1919 the total net ton miles showed a reduction of 9.7 per cent as compared with 1918, and 1918 showed an increase of 1.8 per cent over 1917.

The net ton mile of revenue and non-revenue freight handled by the railways in 1919 was 394,804,349,000 as compared with 437,018,918,000 in 1919. This is a decrease of 42,214,000,000 or 9.7 per cent. If this had all been revenue freight and had paid the average rate of .967 cents which Mr. Hines has stated was the average for the first nine months of 1919 it would have added something over \$400,000,000 to the gross earnings, which would have wiped out the deficit if it had not cost anything to handle it. At the operating ratio of 84.66 shown for 11 months of 1919 it would have reduced the deficit by only about \$63,000,000, although the larger amount of business, of course, should have reduced the operating ratio. But if the freight rates had been advanced 10 per cent in 1919 approximately \$380,000,000 would have been added to the earnings without increasing the expenses, and the deficit would have been avoided. The railroad companies will want more than 10 per cent because they want more net operating income, for the increased traffic and the increased investment required properly to handle the increased traffic, than they received in the years ending June 30, 1915, 1916 and 1917, in spite of the fact that Commissioner Woolley refers to two of them as "miracle years."

Mr. Hines' statement was in part as follows:

"As has been heretofore explained, the destructive effect of the coal strike was particularly severe upon railroad operations in November and had even greater cumulative effect on December, in which month the dislocation of transportation became exceedingly serious. There had to be a drastic temporary curtailment of passenger service and every element of operation and traffic movement was made more difficult and less profitable. The result is that these two months, which should have shown little if any loss in the absence of this adverse influence, showed a total loss of \$111,500,000 after allowing for two-twelfths of the annual rental, or a total of

\$117,200,000 after allowing the proportion of the annual rental corresponding to the proportion of the annual net operating income which was earned in these two months of the test period. The details for November have been given and preliminary statement for December is shown below.

"As December completed the second year of federal operation it is desirable to call attention to the fact that during the two years of federal operation, including of course the two coal strike months of November and December, 1919, the loss, after allowing for the two years' rental, was \$594,200,000. If the increase in rates which became effective in June, 1918, had become effective on January 1, 1918, the entire loss for the two years, after paying the rental, would have been about \$104,000,000, which is more than accounted for by the loss in the two coal strike months of November and December.

"It is only fair to say that the increased rates were in effect all of the year 1919 and that if the year 1919 be considered by itself there appears a loss of about \$349,200,000. Of this loss, \$228,700,000 occurred in the first six months of 1919 and was very largely accounted for by the abnormal and prolonged slump in freight business following the Armistice and practically all of the remainder of the loss, except \$3,000,000, is accounted for in the two coal strike months of November and December, 1919.

"The preliminary report of the operating results for practically all of the Class (1) railroads and large terminal companies in federal operation indicate that the net operating income for the month of December, 1919, from the operation of these properties, will be about \$12,700,000. This represents a loss of \$62,300,000 to the government, after allowing for one-twelfth of the annual rental of \$900,000,000, or a loss of \$59,800,000 as compared with the net operating income earned in the average December of the test period.

"In stating the results for 1919 and 1918 adjustment has been made for back pay included in the operating expenses for 1919 which was applicable to 1918 and adjustment has also been made for back pay in the four months ended October 31, 1919, applicable to the six months ended June 3, 1919. The operations for October have also been credited with \$6,000,000 on account of per diem charges between federally operated lines included in the equipment rent for the month, which represented a mere bookkeeping entry, and the operations for 1918 have been charged with like amount to offset a corresponding bookkeeping entry in July, 1919, when per diem charges were discontinued between federal lines.

"The preliminary reports on passenger traffic during December indicate a small increase over December, 1918. The passenger miles for the 11 months ended November 30, 1919, were about 8.5 per cent greater than during the same period of 1918, and 18.6 per cent greater than during the same period of 1917."



A Scene at Tientsin, China

General News Department

The general offices of the Georgia Railroad and of the Charleston & Western Carolina, at Augusta, Ga., were destroyed by fire on January 24; estimated loss \$50,000.

The National Association of Railroad Tie Producers has postponed its annual convention, scheduled to be held at the Hotel Sherman, Chicago, on February 12 and 13, until March, on account of the influenza epidemic. Definite dates will be announced later.

The American Institute of Consulting Engineers, through its Council, has elected the following officers: President, Alexander C. Humphreys; vice-president, S. Whinery; secretary and treasurer, F. A. Molitor. The secretary's office is at 35 Nassau street, New York City.

The Industrial Conference, called by President Wilson in an effort to work out a plan for the settlement of industrial disputes, is reported as about ready to submit a final plan embodying suggestions received on the tentative plan made public a few weeks ago. Daniel Willard, president of the Baltimore & Ohio; L. E. Sheppard, president of the Order of Railway Conductors, and Glenn E. Plumb, counsel for the railway labor organizations, have testified before the conference, and other railway labor leaders were expected to appear before it this week.

The United States Civil Service Commission announces examinations, all over the country, on March 3 and 4, for the position of examiner under the Interstate Commerce Commission, salary \$3,000 to \$5,000. Examiners hold public hearings on important questions. Persons taking this examination must be at least 25 years old, and must have had two years' actual experience in legal work, or in lieu thereof, three years' experience with state or federal commissions, or in responsible legal or traffic positions. The commission may also select men under this examination for valuation work and other duties.

By a strike of 1,200 freight handlers at the stations of the Boston & Maine and the Boston & Albany in Boston, begun on January 28, westbound shipments had to be largely embargoed for a week and freight movements in all directions in and around Boston were seriously hampered. On Wednesday of this week the strikers voted to return to work at once, pending a decision at Washington of their demands for increased pay. The strike was started as a protest against the long time taken by the Washington committee to settle the wage demands. The freight handlers of the New York, New Haven & Hartford did not strike.

The Carnegie Corporation, of New York City, has given \$5,000,000 for the use of the National Academy of Sciences and the National Research Council. A portion of the money will probably be used for the erection of a building in Washington which will house these two beneficiary organizations, and the remainder will be used as a permanent endowment for the National Research Council. The Council is a democratic organization composed of delegates from approximately 40 scientific and engineering societies of the country. Organized in 1916 as a measure of national preparedness, the Council has, since the war, been reorganized and now purposes to stimulate and promote scientific research in industry, agriculture and medicine.

Rocky Mountain and Pacific Coast Douglas Fir

While no authentic records are available concerning the relative durability of Pacific Coast Douglas fir and Rocky Mountain Douglas fir cross-ties inserted in the same localities, the Forest Products Laboratory, Madison, Wis., has found that such records as there are, fail to show any appreciable difference, contrary to

the general belief that the Rocky Mountain fir is the most durable. The coast grown fir, because of its greater density, is somewhat harder and stronger than the mountain grown, but since ties of coast grown fir are generally cut from the poorer parts of the tree, there is little or no difference in the durability of either kind when used for cross-ties. It has been observed, however, that the former will take preservative treatment with slightly better results.

American Foundrymen's Association

The board of directors of the American Foundrymen's Association, at its annual meeting held in Cleveland on January 13, voted unanimously in favor of holding the convention and exhibit of the association this year in Columbus, Ohio, during the week beginning Monday, October 4. The exhibition buildings on the Ohio State Exposition Grounds will be used for the exhibits. Adjoining buildings provide lecture halls and meeting rooms.

Sodium Fluoride a Timber Preservative

Recent service tests made by the Forest Products Laboratory, Madison, Wis., of sap-pine and red oak ties treated with sodium fluoride, zinc chloride and creosote have indicated that the sodium fluoride treatment has many possibilities as a timber preservative. These service tests, which were the result of a series of laboratory tests, started in 1914 in conjunction with the Tennessee Coal, Iron & Railway Company and the Baltimore & Ohio. After five years' service the ties treated with the three above-mentioned preservatives were all sound, while untreated ties installed at the same time were in various advanced stages of decay. Other tests have been started since 1914 in order to secure more complete data on the possibilities of the sodium fluoride treatment in comparison to other methods of timber preservation.

Northwestern Lumbermen on Railroad Legislation

The Northwestern Lumbermen's Association held its annual convention at Minneapolis, Minn., on January 20, 21 and 22, and sent to members of the House Committee at Washington resolutions urging legislation to permit the return of the railroads to their owners, with proper supervisory control by the Interstate Commerce Commission. The lumbermen favor leaving to the state commissions such regulatory powers "as will enable them to function properly on local and intrastate matters;" a statutory provision that freight rates shall be adequate, as well as reasonable; the continued pooling of freight cars; the joint use of terminals; a law giving the Interstate Commerce Commission full power over cars, and legislation "preventing any general railroad strike." They are against any form of permanent guarantees, against limitations of earnings as now provided for in the Senate bill, and against pooling of earnings. They would oppose the proposed transportation board, on the ground that it will create confusion and divide responsibility.

Material Specification for Tank Cars

The Mechanical Section of the American Railroad Association has recently issued circular No. S III-92, giving notice that the suspension of the requirement for boiler plate steel, flange quality, for plates of class III tank cars, as authorized by circular No. S III-67, dated October 10, 1919, is extended to continue in effect until April 1, 1920, only.

The material for all plates of tanks of class III tank cars built after that date must comply with section 2 (a) of the specifications for class II tank cars, 1919 edition, page 21, which reads as follows:

"Material—(a) For cars built after April 1, 1920, all plates for tank and dome shall be of steel, complying with the Ameri-

can Society for Testing Materials specifications for boiler plate, flange quality."

The tank car specifications, as revised 1919, effective February 1, 1920, are now ready for distribution, and will be supplied at the following prices to members of the association: 100 copies or more, \$15 per 100; 50 copies, \$8; less than 50 copies, each 25 cents.

Tie Producer's Convention

The annual convention of the National Association of Railroad Tie Producers will be held at the Hotel Sherman, Chicago, on February 12 and 13. The first day will be devoted primarily to the consideration of routine business matters of the organization. The program on Friday is as follows:—

10 A. M.—Report of Special Committee on Specifications, Walter Polman, chairman.

10:45 A. M.—Practical Reforestation, with especial reference to financial return, Howard Andrews.

11:30 A. M.—The Present Railway Problem, and its relation to the National Association of Railroad Tie Producers, Samuel O. Dunn, editor *Railway Age*.

2:00 P. M.—Production and Shipment of Cross Ties on the West Coast, E. M. Blake.

2:30 P. M.—The manufacture of cross ties with saw mills and its possible influence upon cross tie prices, R. J. Witherell.

3:15 P. M.—Closing business.

Railroad Outrages in Mexico

Instances of attacks, derailments and dynamiting of trains in Mexico during the year 1919 numbered 64, according to an official Mexican report which has been made public at Washington. The instances reported were chiefly in (a) the northern part of the country (b) on the Mexican Railway between Mexico City and Vera Cruz, and (c) on the Tehuantepec line.

The report makes a point of the fact that the greater number of these wrecks as a result of rebel activities occurred during the first half of the year. In the last half the United States forbade shipments of arms and munitions, including dynamite, into Mexico, but the decrease in the number of outrages was credited in the report to changes in the personnel of the railroad administration, the appointment of General Manager Fontes to run the railroads, and his activities on inspection trips. The building of a series of block-houses along the Vera Cruz-Mexico City line and named by soldiers is given as a reason for the decrease on that line.

The railroads suffered losses of \$50,000, eight locomotives and 170 freight and passenger cars as a result of the rebel raid. In addition to this, more than \$250,000 worth of freight and baggage was reported to have been destroyed or stolen by rebels.

Three Great Dates

"The Three Great Dates in History, or Gone, Gone, Going," is the subject of a recent safety bulletin issued by the safety organization of the Pere Marquette and associated roads. The three great dates are, according to the bulletin, January 1, 1863, when Abraham Lincoln issued the Emancipation Proclamation which, followed by the Thirteenth Amendment, put an end to slavery; January 16, 1920, when the Eighteenth Amendment to the United States Constitution became effective, abolishing the manufacture and sale of intoxicating liquors for beverage purposes, and February 19, 1918, when the director general of railroads created the Safety Section and established a safety organization on every railroad under federal control.

In discussing the relation of these dates to each other the bulletin says:

"Slavery and liquor have been abolished by amendments of the United States Constitution, but carelessness cannot be reached in that way. It is a thing in and of ourselves, and only by education and personal discipline can it be subdued. That we are subduing this enemy within us is proved by the

fact that during last year there was a reduction of over 20 per cent in the number of employees killed and injured on the railroads of this country, in spite of the fact that the roads were handling the largest volume of traffic in their history. But really we have only made a start. The time will come when carelessness, like slavery and rum, will no longer figure as one of our social problems."

North Western Executive Personnel to Be Changed

Current reports, apparently authentic, indicate that radical changes will be made in the operating personnel of the Chicago & North Western when it is returned to its corporate owners on March 1. These reports state that the following will not return to the North Western staff: R. H. Aishton, formerly president and now regional director of the Northwestern region; S. C. Strickland, formerly general manager, lines east, and now federal manager; E. E. Nash, formerly assistant general superintendent and now assistant to the federal manager; Jas. C. Davis, federal general solicitor; L. S. Carrol, formerly general purchasing agent and now federal purchasing agent; C. D. Brandriff, formerly general auditor and now federal auditor; A. A. McLaughlin, now assistant general solicitor, and A. B. Jones, formerly local treasurer at Chicago and now federal treasurer.

Regarding the organization which will be formed after March 1, it is stated that W. H. Finley, now president of the corporation, will continue in that capacity; Marvin Hughitt, Jr., prior to government control vice-president in charge of operation, will resume that position; F. J. Burke, at present purchasing agent of the Superior Coal Company, Chicago, will succeed Mr. Carrol as purchasing agent; F. Walters, formerly general manager, Lines West, now general manager, will continue in the latter capacity, and F. H. Hammill, general superintendent of the Union Pacific, with headquarters at Omaha, Neb., will become assistant general manager. It is also indicated that W. J. Towne, now assistant general manager Lines West, will be appointed engineer maintenance of way after the return is made.

Corporate officers of the Chicago & North Western who are in a position to verify or deny these rumors have refused to make any definite announcements at this time.

The Corbeil Collision

The rear collision of passenger trains on the Canadian Pacific near Corbeil, Ont., eight miles east of North Bay, on Sunday, January 25, about 11 a. m., briefly reported in the *Railway Age* of January 30, resulted in the death of eight passengers and a sleeping car porter, and the injury of four trainmen and 21 passengers. The inquest, held at North Bay on January 26, as reported in despatches of the Canadian Associated Press, brought out the principal circumstances.

Westbound passenger train No. 1, first section, was stalled because of low steam. Engineman J. R. Davidson sounded his whistle as a signal to the flagman to go back, and Flagman T. J. Curley went back and placed torpedoes on the rail. Curley says that he went back 20 telegraph poles. After restoring boiler pressure Davidson called in the flagman. After a time he whistled again and finally got a proceed signal about 12 minutes after the first call. He had moved his train forward a very short distance when he felt the shock of the collision, which caused his engine to break away from its train. Curley had got back to within a short distance of his train when he saw that the second section had not heeded his torpedoes. He then made hand motions to stop it, but apparently not until the oncoming train was very close to the point of collision. Isidore Godin, engineman of the second section, said that he did not see the train ahead until he was within a car's length of it. He had not heard any torpedoes, and he was running 35 miles an hour or faster at the time he struck. The rear car of the leading train, an observation car, was completely crushed, and the two sleeping cars next ahead of it were wrecked. The locomotive fell over to one side and lodged on one of the sleeping cars.

Flagman Curley, about a half hour after the collision, went

back and gathered up the fragments of the torpedoes. In testifying concerning the torpedoes he said that those now in use were not as good as those formerly supplied.

The collision occurred on a curve to the left; but the fireman of the second section did not see the train ahead until the moment of collision.

Two locomotive engineers testified concerning experiences with torpedoes and told of instances where they had failed to explode; and one of these witnesses said that on the day of the collision he had run over torpedoes near Bonfield but did not hear them, and only knew of their presence by the smell of gunpowder.

The coroner's jury recommended that the road use the block system.

Annual Exhibition of the N. R. A. A.

Successfully solving the problem of allotting space to 32 new exhibitors, the board of directors of the National Railway Appliances Association has completed the assignment of exhibiting space for the twelfth annual exhibition to be held at the Coliseum and Annex, Chicago, from March 15 to 18, inclusive, in conjunction with the annual convention of the American Railway Engineering Association and the stated meeting of the Signal Section of the American Railroad Association. The accommodation of the additional number of exhibitors was accomplished without changing the general floor plan which has proved so successful in past years. When the applications from the regular exhibitors were received it was found that they were asking for 20 per cent more space than was available. The problem was solved by assigning only the usual amount of space to all of the old exhibitors and then curtailing the space allotted in several cases. The result has been that there are but three companies whose request for space has not been fulfilled this year as compared with 35 at this time last year.

The decorative scheme adopted by the Association for its exhibition this year will be apple green and white, with the partitions between the booths and the signs in gold bronze. A ceiling is to be arranged, composed of three festoons of alternate apple green and white which will cover the entire ceiling.

A new feature has been instituted this year in that the Association is planning to handle all furniture, electrical fixtures and decorative effects, instead of, as heretofore, allowing this work to be handled by outside agencies. In addition the Association has restricted the furniture to either oak or mission.

The list of exhibitors who have been assigned space is as follows:

Adams & Westlake Company, Chicago.
 Adams Motor & Manufacturing Company, Chicago.
 A. G. A. Railway Light & Signal Company, Elizabeth, N. J.
 Air Reduction Sales Company, New York.
 Alexander Crossing & Equipment Company, Chicago.
 Alexander Milburn Company, Baltimore, Md.
 American Abrasive Metals Company, New York.
 American Chain Company, Inc., Bridgeport, Conn.
 American Hoist & Derrick Company, St. Paul, Mich.
 American Kron Scale Company, New York.
 American Malleable Castings Association, McKee's Rocks, Pa.
 American Rail Joint Company, Philadelphia, Pa.
 American Railroad Signal Supervisors' Association, Chicago.
 American Railway Bridge & Building Association, Chicago.
 American Spike Company, New York.
 American Steel & Wire Company, New York.
 American Valve & Meter Company, Cincinnati, O.
 American Vulcanized Fibre Company, Pittsburgh, Pa.
 Anchor Company, New York.
 Armco Iron Culvert & Flume Manufacturers' Association, Middletown, O.
 Austin Company, Cleveland, Ohio.
 Balkwill Manganese Crossing Company, Cleveland, Ohio.
 Barrett Company, New York.
 Bay City Foundry & Machinery Company, Bay City, Mich.
 Benjamin Electric Manufacturing Company, Chicago.
 Bethlehem Steel Company, Bethlehem, Pa.
 Boss Nut Company, Chicago.
 Blaw-Knox Company, Pittsburgh, Pa.
 Bryant Zinc Company, Chicago.
 Buda Company, Chicago.
 Buffalo Forge Company, Buffalo, N. Y.
 Cambria Steel Company, Philadelphia, Pa.
 Carbic Manufacturing Company, Duluth, Minn.
 Carter Bloxomend Flooring Company, Chicago.
 Chicago Bridge & Iron Works, Chicago.
 Chicago Flag & Decorating Company, Chicago.

Chicago Malleable Castings Company, West Pullman, Ill.
 Chicago Pneumatic Tool Company, Chicago.
 Chicago Railway Signal & Supply Company, Chicago.
 Clark Car Company, Pittsburgh, Pa.
 Cleveland Frog & Crossing Company, Cleveland, Ohio.
 Copper Clad Steel Company, Chicago.
 Crerar, Adams & Co., Chicago.
 Detroit Graphite Company, Detroit, Mich.
 Diamond State Fibre Company, Bridgeport, Pa.
 Dickinson, Paul, Inc., Chicago.
 Dilworth Porter & Co., Pittsburgh, Pa.
 Duff Manufacturing Company, The, Pittsburgh, Pa.
 Edison Storage Battery Company, Orange, N. J.
 Edison, Inc., Thos. A., New York City.
 Electric Storage Battery Company, The, Philadelphia, Pa.
 Equipment Corporation of America, Chicago.
 Eymon Crossing Company, The, Marion, Ohio.
 Fairbanks Company, The, New York.
 Fairbanks, Morse & Co., Chicago.
 Fairmont Gas Engine & Railway Motor Car Company, Fairmont, Minn.
 Federal Signal Company, Albany, N. Y.
 Federal Sign System (Electric), Chicago.
 Frog, Switch & Manufacturing Company, The, Carlisle, Pa.
 General Electric Company, Schenectady, N. Y.
 General Railway Signal Company, Rochester, N. Y.
 Gilbert & Barker Manufacturing Company, Springfield, Mass.
 Gosso Company, The, Chicago.
 Gould Storage Battery Company, Chicago.
 Graver Tank Corporation, East Chicago, Ind.
 Gurley, W. & L. E., Troy, N. Y.
 Hall Switch & Signal Company, Garwood, N. J.
 Hatfield Rail Joint Manufacturing Company, Macon, Ga.
 Hayes Track Appliance Company, Richmond, Ind.
 Hazard Manufacturing Company, Wilkes-Barre, Pa.
 Hebard, W. F., Chicago.
 Hubbard & Co., Pittsburgh, Pa.
 Hyatt Roller Bearing Company, New York.
 Imperial Belting Company, Chicago.
 Ingersoll-Rand Company, New York.
 Johns-Manville Company, H. W., New York.
 Jones & Laughlin Steel Company, Pittsburgh, Pa.
 Jordan Company, O. F., East Chicago, Ind.
 Kalamazoo Railway Supply Company, Kalamazoo, Mich.
 Kaustine Company, Inc., Buffalo, N. Y.
 Kelly-Derby Company, Inc., Chicago.
 Kerite Insulated Wire & Cable Company, New York.
 Keystone Grinder & Manufacturing Company, The, Pittsburgh, Pa.
 Kilborne & Jacobs Manufacturing Company, Columbus, Ohio.
 Lackawanna Steel Company, Lackawanna, N. Y.
 Lehon Company, The, Chicago.
 Liberty Steel Products Company, Inc., New York.
 Long, Chas. R., Jr., Company, Louisville, Ky.
 Lundie Engineering Corporation, The, New York.
 Lufkin Rule Company, The, Saginaw, Mich.
 Luther Grinder Manufacturing Company, Milwaukee, Wis.
 M. W. Supply Company, Philadelphia, Pa.
 Macomber & Whyte Rope Company, Kenosha, Wis.
 MacRae's Blue Book Company, Chicago.
 Madden Company, The, Chicago.
 Massey Concrete Products Corp., Chicago.
 McGraw-Hill Publishing Company, New York.
 Mercury Mfg. Company, The, Chicago.
 Miller Train Control Corporation, Danville, Ill.
 Monroe Calculating Machine Company, New York.
 Mudge & Company, Chicago.
 National Carbon Company, Inc., Cleveland, Ohio.
 National Indicator Company, Long Island City, N. Y.
 National Lead Company, New York.
 National Lock Washer Company, The, Newark, N. J.
 National Malleable Castings Company, The, Cleveland, Ohio.
 National Railway Appliance Association, Chicago.
 National Surface Guard Company, Chicago.
 National Water Main Cleaning Company, New York.
 Nichols & Brother, Geo. P., Chicago.
 North American Engine Company, Algoma, Iowa.
 Ogle Construction Company, Chicago.
 Okonite Company, The, Passaic, N. J.
 O'Malley Beare Valve Company, Chicago.
 Oxweld Railroad Service Company, Chicago.
 P. & M. Company, The, Chicago.
 Page Steel & Wire Company, New York.
 Peyton Safety Rail Joint Company, Centralia, Ill.
 Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa.
 Pocket List of Railroad Officials, New York.
 Positive Rail Anchor Company, Marion, Ind.
 Protective Signal Manufacturing Company, The, Denver, Colo.
 Pyrene Manufacturing Company, Chicago.
 Pyro-Non Paint Company, Inc., New York.
 Q & C Company, New York.
 Rail Joint Company, The, New York.
 Railroad Herald Company, The, Atlanta, Ga.
 Railroad Supply Company, The, Chicago.
 Railway Review, Chicago.
 Ramapo Iron Works, Hillburn, N. Y.
 Reade Manufacturing Company, Hoboken, N. J.
 Reading Specialties Company, Reading, Pa.
 Richards-Wilcox Manufacturing Company, Aurora, Ill.
 Roadmasters' & Maintenance of Way Association, Sterling, Ill.
 Roberts & Schaefer Company, Chicago.
 Safe Lock Switch Machine Company, Lexington, Ky.
 Sellers Mfg. Company, Chicago.

Signal Accessories Company, New York.
 Simmons-Boardman Publishing Company, New York.
 Snow Construction Company, T. W., Chicago.
 Southern Pine Association, New Orleans, La.
 Southern Railway Supply & Equipment Company, St. Louis, Mo.
 Squire Cogswell Company, Chicago.
 Standard Asphalt & Refining Company, Chicago.
 Steel Sales Corp., Chicago.
 Sullivan Machinery Company, Chicago.
 Sumner Engine Company, Fairmont, Minn.
 Templeton, Kenly & Co., Ltd., Chicago.
 Thompson Signal Company, Los Angeles, Cal.
 Toledo Scale Company, Toledo, Ohio.
 Track Specialties Company, New York.
 Train Control Appliance Company, El Paso, Tex.
 Torchwell Equipment Company, Chicago.
 Union Switch & Signal Company, Swissvale, Pa.
 U. S. Wind Engine & Pump Company, Batavia, Ill.
 U. S. Light & Heat Corp., Niagara Falls, N. Y.
 Verona Tool Works, Chicago.
 Volkhardt Company, Inc., Stapleton, N. Y.
 Walls Frogless Switch & Mfg. Company, Kansas City, Mo.
 Waterbury Battery Company, Tae, New York.
 Wayne Oil Tank & Pump Company, Ft. Wayne, Ind.
 Western Electric Company, New York.
 Wharton & Company, Wm., Jr., Inc., Easton, Pa.
 Wheaton & Probasco, Ionia, Mich.
 Woolery Machine Company, Minneapolis, Minn.
 Wyoming Shovel Works, The, Wyoming, Pa.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

- AIR BRAKE ASSOCIATION.**—F. M. Nellis, 165 Broadway, New York City. Next convention, May 5-7, 1920, Chicago.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.**—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.
- AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.**—S. W. Derr, C. R. R. of N. J., Philadelphia, Pa.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.**—R. O. Wells, Illinois Central, Chicago. Next annual meeting, June, 1920.
- AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.**—E. R. Reynolds, C. G. W. R. R., Chicago.
- AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.**—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.**—J. Rothschild, Union Station, St. Louis, Mo.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.**—E. B. Burritt, 8 W. 40th St., New York.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.**—C. F. J. Dell, 50 E. 42nd St., New York.
- AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.**—Otto E. Schlinck, 185 W. 5th St., Peru, Ind.
- AMERICAN RAILROAD ASSOCIATION.**—J. E. Fairbanks, 75 Church St., New York.
- Section I, Operating (including former activities of Association of Railway Telegraph Superintendents).**—W. J. Fripp (chairman), N. Y. C. R. R., New York, N. Y.
- Telegraph and Telephone Division.**—J. F. Caskey (chairman), Supt. of Telegraph, Lehigh Valley.
- Section II, Engineering.**—E. H. Fritch, 431 South Dearborn St., Chicago.
- Signal Division.**—H. S. Balliet, 75 Church St., New York.
- Section III, Mechanical (including former activities of Master Car Builders' and Master Mechanics' Association).**—V. R. Hawthorne, 431 South Dearborn St., Chicago. Next convention, June 9-16, 1920, Atlantic City, N. J.
- Section IV, Traffic.**—Robert C. Wright (chairman), Assistant Director, Division of Traffic, U. S. R. A., Washington, D. C.
- Section V, Transportation (including former activities of Association of Transportation and Car Accounting Officials).**—E. J. Pearson (chairman), Federal Manager, N. Y., N. H. & H. R. R., New Haven, Conn.
- Section VI, Purchases and Stores (including former activities of Railway Storekeepers' Association).**—J. P. Murphy, N. Y. C. R. R., Collinwood, Ohio.
- Section VII, Freight Claims (including former activities of the Freight Claim Association).**—Lewis Pilcher, 431 South Dearborn St., Chicago.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.**—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Austin Station, Chicago. Next convention October 19-21, 1920, Atlanta, Ga.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.**—(Works in co-operation with the American Railroad Association, Section II.) E. H. Fritch, 431 South Dearborn St., Chicago. Next convention, March 16-18, 1920, Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.**—(See American Railroad Association, Section III, Mechanical.)
- AMERICAN RAILWAY PERISHABLE FREIGHT ASSOCIATION.**—E. F. McPike, 135 E. 11th Place, Chicago. Regular meetings, 2d Wednesday in March and September.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.**—R. D. Fletcher, 1145 East Marquette Road, Chicago.
- AMERICAN SOCIETY FOR TESTING MATERIALS.**—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Next annual meeting, June 21, 1920, New Monterey Hotel, Asbury Park, N. J.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.**—Col. H. S. Cracker (acting secretary), Engineering Societies Building, 33 W. 39th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 33 W. 39th St., New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.**—Calvin W. Rice, 29 W. 39th St., New York.
- AMERICAN STEEL TREATERS' SOCIETY.**—Arthur G. Henry, Illinois Tool Works, Chicago.
- AMERICAN TRAIN DESPATCHERS' ASSOCIATION.**—D. L. Darling, Northern Pacific Ry., Spokane, Wash.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.**—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next annual meeting, February 10-12, 1920, Hotel Sherman, Chicago.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.**—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J. Next meeting, May, 1920, Atlantic City.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.**—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago.
- ASSOCIATION OF RAILWAY EXECUTIVES.**—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.**—(See American Railroad Association, Section I, Operating.)
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.**—(See American Railroad Association, Section V, Transportation.)
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.**—M. J. Trees, Chicago Bridge & Iron Works, Chicago.
- CANADIAN RAILWAY CLUB.**—W. A. Booth, 131 Charron St., Montreal, Que.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.**—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.
- CAR FOREMEN'S ASSOCIATION OF ST. LOUIS.**—Thomas B. Koenke, Federal Reserve Bank Bldg., St. Louis, Mo.
- CENTRAL RAILWAY CLUB.**—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November, and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.
- CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.**—J. C. Keene, General Car Inspector, Wabash R. R., Decatur, Ill.
- CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.**—D. B. Wright, Lehon Company, 45th and Oakley Sts., Chicago.
- EASTERN RAILROAD ASSOCIATION.**—D. G. Stuart, Washington, D. C.
- FREIGHT CLAIM ASSOCIATION (See American Railroad Association, Section VII, Freight Claims).**
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.**—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3rd Friday in month, Room 856, Insurance Exchange Bldg., Chicago.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.**—A. L. Woodworth, B. & O., Lima, Ohio.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.**—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May, 1920, Hotel Sherman, Chicago.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.**—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn.
- MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.**—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Building, Kansas City, Mo. Next convention, October 5-7, 1920, Detroit, Mich.
- MASTER BOILER MAKERS' ASSOCIATION.**—Harry D. Vought, 95 Liberty St., New York. Next annual meeting, May 25-28, Curtis Hotel, Minneapolis, Minn.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.**—A. P. Dane, B. & M., Reading, Mass.
- MASTER CAR BUILDERS' ASSOCIATION.**—(See American Railroad Association, Section III, Mechanical.)
- NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.**—James B. Walker, 49 Lafayette St., New York. Next convention, November, 1920, Washington, D. C.
- NATIONAL FOREIGN TRADE COUNCIL.**—O. K. Davis, 1 Hanover Square, New York. Next convention, May 12-15, 1920, San Francisco.
- NATIONAL RAILWAY APPLIANCE ASSOCIATION.**—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago.
- NEW ENGLAND RAILROAD CLUB.**—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.
- NEW YORK RAILROAD CLUB.**—Harry D. Vought, 95 Liberty St., New York. Regular meeting 3d Friday in month, except June, July and August, 29 W. 39th St., New York.
- PACIFIC RAILWAY CLUB.**—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting 2d Thursday in month, alternately in San Francisco and Oakland.
- RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.**—E. R. Woodson, 1116 Woodward Bldg., Washington, D. C. Next convention, May 12, Atlantic City, N. J.
- RAILWAY BUSINESS ASSOCIATION.**—Frank W. Noxon, 30 Church St., New York.
- RAILWAY CLUB OF PITTSBURGH.**—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month except June, July and August, Americus Club House, Pittsburgh, Pa.
- RAILWAY DEVELOPMENT ASSOCIATION.**—D. C. Welty, Missouri Pacific R. R., Little Rock, Ark.
- RAILWAY ELECTRIC SUPPLY MANUFACTURERS' ASSOCIATION.**—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.
- RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.**—D. L. Eubank, Galena Signal Oil Company, Richmond, Va.
- RAILWAY FIRE PROTECTION ASSOCIATION.**—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.
- RAILWAY REAL ESTATE ASSOCIATION.**—R. H. Morrison, C. & O., Richmond, Va.
- RAILWAY SIGNAL ASSOCIATION.**—(See American Railroad Association, Section II, Signal Division.)
- RAILWAY STOREKEEPERS' ASSOCIATION.**—(See American Railroad Association, Section VI, Purchases and Stores.)
- RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.**—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Next convention, June 9-16, Atlantic City, N. J.
- RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.**—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.**—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill.
- ST. LOUIS RAILWAY CLUB.**—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.
- SIGNAL APPLIANCE ASSOCIATION.**—F. W. Edmunds, West Nyack, Rockland County, New York.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.**—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.
- SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.**—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.**—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.
- SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.**—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.
- TRACK SUPPLY ASSOCIATION.**—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y.
- TRAVELING ENGINEERS' ASSOCIATION.**—W. O. Thompson, N. Y. C. R. R., Cleveland, O.
- WESTERN ASSOCIATION OF SHORT LINE RAILROADS.**—Clarence M. Oddie, Mills Bldg., San Francisco.
- WESTERN RAILWAY CLUB.**—J. M. Byrne, 916 W. 78th St., Chicago. Regular meetings, 3d Monday in month, except June, July and August.

Traffic News

George P. Gwin of the Ford Motor Company, Pittsburgh, Pa., has been appointed assistant traffic manager of the Torbensen Axle Company, Cleveland, Ohio.

An association of commercial travelers has petitioned the Congressional conferees on the railroad bill to provide for the sale of 2,000-mile books at 20 per cent less than ordinary passenger fares.

R. D. Sangster, transportation commissioner for the Kansas City (Mo.) Chamber of Commerce, has been appointed industrial commissioner for the St. Louis (Mo.) Chamber of Commerce, effective March 1.

The \$10-a-day penalty charge for detention of refrigerator cars after five days beyond free time will be discontinued on February 10, the Division of Traffic of the Railroad Administration having filed a tariff amendment to that effect.

The Secretary of War has approved the application of the director general of railroads for the use of 900 linear feet of wharfage and 50,000 square feet of storage space at the army supply base, New Orleans, La., for the barge line operated by the Mississippi-Warrior River Section, Division of Inland Waterways, of Railroad Administration.

The Silk Association of America and the Merchants' Association of New York City have complained to the Railroad Administration about a decision, recently announced, to refuse to carry raw silks as ordinary freight. If this order is due to the fact that large quantities of silk have been stolen, the Administration is asked to consider that the same is true of other valuable commodities; and it is observed that if the Administration decides that it is unable to cope with thefts in transportation it will lay open to severe criticism.

The Railway Association of Canada, at the request of a member railway, has modified Clause 3 of Circular 98, of January 31, 1919, governing the return of freight cars to United States roads. By the rule in question, which was adopted to obviate delays in time of war traffic pressure, empty cars were returned to the States via the nearest junction point, but now it is decided that when a load cannot be obtained a car shall not be offered to an intervening carrier which has not previously handled the car. The road holding the car must return it to the United States through its nearest junction with a United States railroad, or else through a junction on the home route.

The National Industrial Traffic League announces favorable results from its conferences with the Division of Public Service and the Division of Traffic of the United States Railroad Administration, concerning freight claims. Its committees report that there is every assurance that all meritorious claims will be paid. It is expected that claims which have accrued under federal control will be received by the individual lines and then referred to a special committee, at Washington, representing the Railroad Administration, which will work out some plan for payment, probably out of an appropriation to be made by Congress. The Railroad Administration fully appreciates the situation.

The Southern Railway announces the restoration of the through passenger trains between Cincinnati and Atlanta which were discontinued last August because of the necessity of rebuilding the bridge over Tennessee river just north of Chattanooga. The new bridge, designed to carry the heaviest locomotives and cars, has been finished, and the new timetables went into effect on January 20. The principal through trains are the Royal Palm between Chicago and Miami, Fla., the Ohio special between Cincinnati and Jacksonville, and the Cincinnati-New Orleans Limited, between Cincinnati and New Orleans by way of Birmingham and Meridian. The new bridge is 1,800 ft. long, 14 deck girder spans and one truss span, 310 ft. long. The truss span is a lift draw. This and four of the deck spans are made wide enough

for two tracks as are all of the piers, but the railroad at present is single track.

According to a report on overseas traffic for the week ended January 21, 1920, made to Director General Hines, there were 5,157 cars of commercial export received at North Atlantic ports, while 5,436 cars were delivered. The receipts at these ports increased 3,741 cars, or 264 per cent compared with the same week in 1919. At South Atlantic and Gulf ports, as of January 18, 1920, there were 11,796 cars of export freight on hand, as against 12,711 on January 11, decrease of 915 cars. On January 21, 1920, there were 9,017,363 bushels of grain stored in elevators at North Atlantic ports. There were received during the week 3,259,820 bushels, while 2,780,203 bushels were cleared. At Gulf ports on January 21, 1920, there were 6,301,058 bushels of grain stored in elevators, representing 62 per cent of the elevator capacity.

Thefts of freight recently reported from Darlington, S. C., were carried out by collusion between checkers in a freight house and employees of wholesale merchants. The freight clerks, after checking certain goods short, sold the property to retail merchants through the medium of truck drivers of wholesale houses. Five white men and three negro truck drivers have been arrested. Railroad and municipal police at Chicago recently arrested four men and two women charged with the theft of \$150,000 worth of merchandise from railroads and express companies in Chicago during the past year. At Detroit, Mich., the police department of the Michigan Central reports the arrest of four men charged with crime in connection with thefts of thousands of dollars worth of merchandise from freight cars in the Detroit yards within the last six months. Wearing apparel, tobacco and other property valued at \$14,000 has been recovered.

Movement of Bituminous Coal

Director General Hines has authorized a statement denying reports recently issued to the effect that the Railroad Administration has discontinued the control over the movement of bituminous coal. "The responsibility for exercising this control where necessary was placed upon the Railroad Administration during the coal strike and the responsibility still exists," he said. "As far as practicable, such coal is being allowed to run from the mines to consignees as billed, but it has been found necessary to continue to restrict the movement of coal for export and in some cases to make diversion of coal from designated consignees. These restrictions and diversions continue to be necessary because of the loss of production of coal during the strike, the very serious dislocation of equipment resulting from the sending of coal produced in the East during the strike to the West, the very unfavorable weather in a large proportion of the coal producing territory, and the depletion of railroad forces by the influenza. All these influences have combined to make it exceedingly difficult for certain public utilities, essential industries and some railroads to secure coal absolutely necessary for current operation and to meet these emergency cases diversions are being made in performance of the duty placed upon the Railroad Administration. With the continuance of the present bad weather indications are that such control will have to be continued for the present at least. The situation has been complicated by the depletion of reserve stocks of public utilities and industries which under normal conditions would be available for use at the present time of the year thus making necessary the delivery of new coal to such organizations. As a result, recently coal has been diverted to an extent from the Pocahontas region to public utilities, industries and railroads in the Allegheny and Eastern region to prevent their shutting down. In spite of the severe weather and the dislocation of coal cars due to the coal strike, the efforts to move coal have resulted in considerably more bituminous coal being transported in recent weeks than in the same period in the last three years. For instance, the amount of bituminous coal, including coal made into coke, moved during the four weeks ended January 31 in 1920 and in the corresponding period of the three preceding years follows: 1920, 44,004,000 tons; 1919, 37,796,000 tons; 1918, 33,422,000 tons; 1917, 41,092,000 tons."

Mail Pay for Short Lines

S. S. Ashbaugh, counsel for the American Short Line Railroad Association, has filed a petition with the Interstate Commerce Commission for additional findings and supplemental orders in the railway mail pay case to provide that the 20 per cent additional rate allowed short lines shall apply to mail routes not less than 50 miles in length and that the 50 per cent additional shall apply to routes 50 miles or less in length; that the minimum pay of \$50 per mile per annum shall apply to space routes after November 1, 1916, and to weight routes from July 1, 1916, to March 1, 1920; that an order be made fixing reasonable mail pay on all weight routes operated by the short lines, as such between July 1, 1916, and March 1, 1920, and on their weight routes which were made space routes by order of the postmaster general; that additional findings be made as to side and terminal service and that an order be issued fixing the weight, size, postage and conditions for the transportation of parcel post packages.

Anthracite Shipments for December

The shipments of anthracite for December, 1919, as reported to the Anthracite Bureau of Information at Philadelphia, made the largest record for that month since 1915: a total of 6,138,460 gross tons, against 5,971,671 tons in November, an increase of 166,789 tons, and a gain of 400,000 tons, as compared with December, 1918. As compared with 1916, the latest normal year, the increase was about 550,000 tons. Shipments by initial carriers were as follows:

	December 1919	December 1916	Coal Year 1919-1920	Coal Year 1916-1917
P. & R. R.	1,442,571	1,040,643	10,741,052	9,424,306
L. V.	1,057,627	964,007	9,689,287	9,038,756
C. of N. J.	506,840	527,080	4,798,731	4,781,181
D. L. & W.	907,119	953,565	8,109,167	7,875,133
D. & H.	674,172	591,874	6,068,559	5,368,560
Penna.	414,155	449,052	3,747,376	4,114,390
Erie	679,827	634,190	5,801,163	5,609,681
N. Y. O. & W.	171,465	147,007	1,535,828	1,431,156
L. & N. E.	284,684	275,329	2,619,218	2,025,214
	6,138,460	5,582,747	53,110,381	49,668,357

Regular Conferences with Shippers

Seth Mann, attorney and traffic manager of the San Francisco Chamber of Commerce, lately a member of the Western Traffic Committee at Chicago, and recently returned to San Francisco, appeals to the public to exercise patience during the period of rehabilitation of the railroads. He says:

"It will require more than one year to bring about any appreciable increase in railroad facilities, and at least five years, with the expenditure of great sums of money, to bring them up to the transportation demands of the country. In the meanwhile there should develop a new kind of railroad publicity and a new attitude of officers and employees toward the public. The public should be kept informed of the difficulties of reorganization and of the progress made and the plans for the future. Shippers' organizations should be consulted as to changes contemplated in rates and practices, to the end that the public may know that carriers are working to the end desired by the public, namely, an efficient transportation service.

"One of the most significant events of the federal demonstration that railroad officers and shippers' representatives can work effectively together. The plan of the freight traffic committee has been successfully carried out, the representation on these committees being equally divided between the carriers and the public. This system, which has been in operation for over a year and a half, has effectively and latterly with reasonable promptness dealt with the railroad rates throughout the United States. For 17 months ending with November last, 21,262 applications for freight rate authorities were acted upon, and 18,570 freight rate authorities were issued. The public representatives on the committees were almost invariably traffic experts connected with shippers' organizations. These shippers' organizations will form the natural conduit through which information will flow to the public, and they will render their most cordial service in helping to solve traffic problems. This situation should bring about a new era in transportation, in which the public shall be made to feel that it is no longer excluded as hostile, but is taken into confidence as the friend and advocate of efficient transportation service."

Commission and Court News

Interstate Commerce Commission

The Commission has ordered a reopening of the case involving the Southern Pacific's ownership of Atlantic steamship lines for testimony on the propriety of granting the permission asked by the company to operate an irregular steamship service between Atlantic ports and Gulf ports.

State Commissions

The Public Utilities Commission of Illinois has suspended for 120 days from March 1 certain intrastate rates filed by a number of roads: the Atchison, Topeka & Santa Fe, the Baltimore & Ohio Chicago Terminal, the Chicago Junction, the Chicago, Rock Island & Pacific, the Chicago, Terre Haute & South Eastern, the Michigan Central, the Terminal Railroad Association of St. Louis, the Toledo, Peoria & Western, and several smaller roads. It is explained that the rates ordered by the federal government on June 24, 1918, have never been approved by the Illinois Commission and this suspension is to give time to consider whether or not approval will be given.

Court News

Assault by Station Agent—Railroad Not Liable

A station agent, also employed as express agent, attacked a person who called for a shipment, against whom he had a grudge arising out of prior dealings as agent, because the caller rebuked him for swearing. The Louisiana Supreme Court, in an action against the railroad and express companies for damages, holds that neither is liable, because the offense was not committed within the scope of the agent's authority; and judgment for the plaintiff was annulled. *Godchaux v. Texas & Pacific (La.) 81 So. 706.*

Crossing Accident—Contributory Negligence

Where the owner of an automobile riding in it while his son was driving, when approaching an obstructed crossing in bad condition, watched his son, who he was afraid could not handle the car properly, instead of looking for the approach of a train, though he knew it was about train time, so that the automobile was struck before it cleared the tracks, the Louisiana Supreme Court held both father and son barred from recovery by their active negligence, the doctrine of last clear chance having no application.—*Leopold v. Texas & Pacific (La.) 81 So. 602.*

Excessive Damages for Failure

to Provide Berth Purchased

A woman who was ill and weak bought a ticket on a Pullman car for a berth convenient to one occupied by her physician and to another occupied by her nurse. She was subsequently told by the conductor that this berth had been sold, but that she would have another in the same car. Another conductor subsequently in charge of the car told her this berth also had been sold and that she would have to take a berth in another car. This threw her into a highly nervous state, rendering her extremely ill and prostrate, and she was permitted to remain in the car by other passengers voluntarily giving her a berth. In an action for damages the Mississippi Supreme Court held, by a divided court, that the Pullman Company was liable, but the court unanimously held that the damages awarded in the trial court, \$2,000, were excessive, and ordered them reduced to \$300.—*Pullman Co. v. Anderson (Miss.) 81 So. 276.*

Risks Assumed in Flagging Trains

The Kentucky Court of Appeals holds that where an experienced trackman who was acquainted with the track and who had been supplied with the customary lights to guide his steps, fell and was injured while hurrying to flag a train at night, in obedience to his foreman, his injuries were due to one of the ordinary risks of his employment. It is generally known that wooden cross-ties after a time become decayed on the sides, without being rendered less serviceable for their purpose and that the ties usually project above the surface of the ground. It is not practicable for a railroad company to maintain tracks of such smoothness and dryness as to remove all probability of a section hand striking his toe and falling.—*L. & N. v. McIntosh* (Ky.) 210 S. W. 181.

Reasonableness of Demand for a Flag Station

The Oklahoma Supreme Court holds that an order of the Corporation Commission, requiring the Kansas City Southern to stop two of its trains, upon being flagged, at a point called Baptist is not a town or village, but a point in a thickly settled farm district. A mail station and post office had been established there, but were discontinued several years previously. The point is about midway between Watt and Westville, Okla., between eight and nine miles apart, at both of which there are railroad facilities. The term "adequate and reasonable facilities" is not capable of exact definition; it calls for such facilities as may be fairly demanded.—*Kansas City Southern v. State* (Okla.) 178 Pac. 662.

Suits Against Railroads Under Federal Control

The Federal District Court for the Eastern District of Louisiana, New Orleans Division, holds that it was the purpose of Congress in adopting the act of March 21, 1918, to allow litigants to sue the railroad companies, just as they had theretofore been able to do, and in such courts as have jurisdiction under the general law. It is held competent for the director general to stipulate in what jurisdiction he might be sued, but his authority to make rules and regulations would not authorize the setting aside of the plain provisions of the statute as to the companies. No harm can come to the railroad corporations. It will be incumbent upon the director general to defend the suit, and to make payment, in the event of a recovery, out of his receipts. The question of an adjustment as between the government and the railroad is one which will come up and be settled when the roads are turned back to their owners, or other disposition of them made. In the meantime, should recovery be had, it is clear, under the terms of the act, that no execution can issue against the physical property of the road.—*Johnson v. McAdoo*, 257 Fed. 757.

Duty Towards Persons on Track After Discovery

In an action for damages for the death of a person killed, while walking along a spar track operated by the defendant, by a coal car which was being pushed by an engine down a slight grade with the steam off, at about five or six miles an hour, the testimony of the engineman showed that he could not see the track ahead and sent a switchman to sit on the front end of the car to keep a lookout. The switchman testified that he saw the deceased on the track 100 yards ahead, but it was shown that the track was frequently used all day by the company's employees and others, and that within two car lengths of the deceased, the latter turned aside as if to leave the track, and that, upon discovering that he was not going to leave the track, the switchman gave the stop signal. It was held by the Alabama Supreme Court that the switchman's duty, so far as subsequent negligence was concerned, dated, not from his discovery of the deceased upon the track, but from the moment he became aware that the deceased was ignorant of the approaching train; and, the evidence not showing such negligence, judgment for the plaintiff was reversed.—*Saginaw Lime & Lumber Co. v. Hale* (Ala.) 81 So. 15.

Foreign Railway News

American Locomotives for Finland

Consul Parker W. Buhrman reports from Helsingfors, under date of December 10, that "delivery has just been made to the Finnish Government of 15 American locomotives. The government is highly pleased with these engines and is in need of about 20 others. Any deal would involve the extension of credit on account of the present unfavorable exchange."

Nicaragua to Have New Railway

Despatches from Managua, Nicaragua, say that negotiations for the raising of a loan of \$10,000,000 have been completed. The money is to be used to improve the highways of the principal departments of Nicaragua and to construct a railroad from west of Matagalpa to the Atlantic seaboard. One railroad building company, the advices state, has offered to construct the railroad in three years.

Electrification Work in Switzerland

Some rather critical remarks concerning the methods of British manufacturers and a strong appeal for their correction are contained in a communication to the Engineer (London) from its correspondent in Berne, who writes on "Electrification Work in Switzerland."

"Electrification work in Switzerland," the correspondent says, "is steadily advancing—indeed, it is being pushed forward so rapidly that, despite the difficulties of procuring the necessary material and labor, it is hoped that the Gothard line between, approximately, Ertfeld and Faido may be run by electricity by about next July. At the beginning of September a credit of 5,000,000f. was granted the Federal Railways solely for the purchase of electric machinery for the line. By the end of 1922 it is calculated that 364 kiloms. will be electrified, not including the Berne-Thun line, which is already worked by electricity, or the Brigue-Sion line, on the Simplon route, also already electrified. For all these stretches the Swiss Federal Railways will require 122 electric locomotives, and of that number not half has as yet been ordered. Electrification work on the Gothard has been delayed because of difficulty in installing the electric equipment. Moreover, it is very hard to get the required number of insulators. For the stretch between Erstfeld and Bellinzona alone, for instance, 47,000 are needed, and up to a few weeks ago only 27,000 were available, although 10,000 were expected from America. Of course, the Swiss Federal and other railways would have been very glad to get much of their electric plant from British firms; but the middleman, who before the war was usually a German, and who arranged the business between Swiss and British firms, disappeared, and apparently there was no one to take his place. And our people in England are either too indifferent or too slow to take advantage of this opportunity afforded them.

"To show the amount of business which British firms might do now, I may say that the electrification of the Swiss Federal Railways alone will require twenty years, and will cost about 125,000,000f. a year. Here, therefore, is a national undertaking which, although that of a small country, implies an expenditure of altogether 2,500,000,000f., and almost all the plant required for it could be supplied by British firms, if they would but bestir themselves. The total of the network of the Swiss Federal Railways at the end of 1918 was 3,018 kiloms., and it is expected that the 1,128 kiloms. belonging to the first section of these railways—that is, about two-fifths of the whole, and the most important lines—will be electrified within less than ten years.

BRITISH CONSPICUOUS BY THEIR ABSENCE

"Owing to the war and to five lean years, the debit balance of the Federal Railways amounted at the end of 1918 to 128,620,354f., and rumors are afloat that some American

syndicate is willing and anxious to supply the Federal Railways with all the necessary money, material and rolling stock for their electrification, which would take then, it is asserted, less than one year. But I cannot confirm the truth of the report. That United States engineering firms are doing something to capture the Swiss engineering market is an undoubted fact. Not only do they regularly send out well-got-up illustrated catalogues, with prices in francs, measures in meters, and weights in kilogrammes and zentner, but competent travelers are visiting Swiss firms in order to endeavor to do business with them. So far as British commercial men are concerned, however, they are conspicuous by their absence.

"Occasionally we happen to see a paragraph in the newspapers about the 'British Board of Trade,' but that apparently covers everything which the Swiss at present know about British commercial life. Electrification, moreover, is in the air at present in Switzerland. Not only is the utilization of Swiss water power being very seriously considered—utilization not for railways alone, but for domestic heating and other household purposes, owing to the extreme and prolonged coal scarcity, but some of the smaller lines, such as the Rhaetian Railway, in the Grisons, are considering or actually at work introducing electric traction. The stretches between Thusis and Filisur, and Filisur and Davos are at present being electrified so fast that it is hoped electric traction may be used very shortly.

"Of course, it must not be thought that Switzerland has no technical electrical industry of her own. Such an industry has existed for years past, and is not a growth of the war, although before the war the Swiss themselves did not take much account of it.

"A good many of the raw materials can be obtained from Great Britain only, and in that case, again, not only is there no one to put these articles on the Swiss market and facilitate Swiss technical electrical works procuring them, but if a Swiss electrical expert at present wishes to go to England to make purchases all manner of obstacles are placed in his way."

Before the war, a Swiss financier told the Engineer correspondent, he avoided doing business in Russia owing to the Russian system of passport regulations, but that he had recently been to England to find a system in force there almost worse.

"I am not sure, of course, how many million francs' worth of machinery trade have been lost to Great Britain owing to this episode, but I know that the orders which this financier intended to place there have gone to the United States. The machinery ordered, I may say, is not for Switzerland alone, but for other countries—even for Russia. At the present time ships are going laden with machinery to certain parts of Russia and returning laden with tobacco, wool, flax, and hides in exchange.

"And now we have the Swiss, who before the war bought their electro-technical articles and apparatus mainly from Germany, purchasing them mostly in their own country, and not in Germany. Since 1913 there has been a great increase of Swiss exports of, for instance, accumulators and accumulator plates; batteries and mounted electros; apparatus and instruments for measuring and reckoning electricity; telephonic and telegraphic machines; all sorts of instruments and apparatus for applied electricity, electric incandescent lamps, &c. Altogether 12,000 people are employed in the Swiss electro-technical industry at present, and, although it has enough raw material for the Swiss market, there is not enough for export purposes, and here, again, England might supply what is wanted.

"But it is not merely in the supply of raw materials for electrical works in Switzerland that British firms might find a market. They might find it in supplying machinery plants of all kinds. Thus, according to the Federal Railway estimates for 1920, there is an item of 121,913,440 f. under the heading of 'construction,' of which 51,332,640 f. are to be spent on electrification alone.

"Although Switzerland is a small country, nevertheless, the Swiss market is not to be despised. The geographical position of the country in the heart of Europe lends it more commercial significance than it would otherwise possess."

Equipment and Supplies

Locomotive Deliveries, Week Ended January 17

New locomotives were shipped during the week ended January 17, as follows:

Works	Road	Number	Type	Individual engine No.
American	T&P	2	Santa Fe	540-41
Lima	PM	1	USRA 8W.Sw	1410
	LE&W	2	USRA 8W.Sw	4250-51
		3		
Total		5		

Locomotive Deliveries, Week Ended January 10

New locomotives were shipped during the week ended January 10 as follows:

Works	Road	Number	Type	Individual engine No.
American	T of St L	9	6-W.Sw	170-8
Lima	PM	9	USRA 8-W.Sw	1406-9
		4		
Total		13		

Cars Built in Railroad Shops in December

The Railroad Administration has compiled the following statement of new cars constructed in railroad shops during the month ended December 31:

Freight—	Steel	Steel under-frame	Steel center sills	Wood	Total
Stock	1	..	16	17
Hopper	2	2
Gondola
Flat	3	3
Coke rack
Work car	2	..	2	4
Miscellaneous freight car...	31	31
Caboose	2	2
Box	23	55	78
Refrigerator
Total freight	3	23	111	137

W. H. Woodin Says Railways Need 849,500 Cars

William H. Woodin, president of the American Car & Foundry Company, has made an investigation as a result of which he estimates that the railroads of the United States will need 849,500 cars during the next three years. It is Mr. Woodin's opinion that while this need, if it is supplied, will run into a tremendous amount of money, the railroads will begin to renew their equipment, once the carriers have been returned to private ownership, and that the money will be forthcoming to finance the undertaking. Unless measures to increase the efficiency of the railroads are consummated he considers that there may be a serious interference with the normal ebb and flow of business. He draws attention to the fact that even now some factories have been forced to close because they cannot get materials, this being due to the car shortage.

To make up the present apparent shortage it is asserted 240,000 cars are needed. Replacement for retirement through the next three years will require 234,300 cars, and to take care of increased business it is estimated that 375,200 cars will be needed in the three-year period. The replacement figure is determined on the basis of an average retirement of 3½ per cent a year and the increased business figure on the basis of a gain of 5 per cent a year.

The following table shows the requirements for replacement and increased business during the three years:

	Replacement	To Handle Increased Business
1920	73,500	118,500
1921	78,000	125,000
1922	82,800	131,700

These requirements, Mr. Woodin believes, are not beyond the capacity of the car builders of the country, but it is believed that under the present adverse conditions regarding purchase of steel and other materials it would not be possible to turn out more than 600,000 cars, or some 200,000 a year.

Locomotives

THE PERE MARQUETTE is inquiring for 10 Pacific type locomotives.

THE FLORIDA EAST COAST is inquiring for 2, six-wheel switching locomotives.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE is inquiring for 5 locomotives.

THE INTERSTATE RAILROAD has ordered 1, 2-8-0 type locomotive from the Baldwin Locomotive Works.

THE GRAND TRUNK.—It is understood that this road will build 25, 0-6-0 switching locomotives at its own shops.

THE CUBA CANE SUGAR CORPORATION has ordered 9, 2-8-0 type locomotives from the Baldwin Locomotive Works.

THE SOROCABANA RAILWAY (Brazil) has ordered 4, 4-6-2 type locomotives from the American Locomotive Company.

THE CHICAGO & NORTH WESTERN is negotiating with the American Locomotive Company for repairs on 10 locomotives.

THE CHICAGO, BURLINGTON & QUINCY, reported in the *Railway Age* of January 23 as about to issue inquiries for 5 locomotives, has ordered 5, 2-8-2 type locomotives from the Baldwin Locomotive Works.

Freight Cars

THE CHESAPEAKE & OHIO is inquiring for from 25 to 50 caboose cars.

THE GRAND TRUNK is in the market for 3,000 automobile cars and 1,000 flat cars.

THE GLOBE SHIPBUILDING COMPANY, Superior, Wis., is inquiring for two flat cars.

THE GREAT WESTERN SHOWS, INC., St. Paul, Minn., is inquiring for one show car.

THE MINNEAPOLIS, ST. PAUL & SIOUX ST. MARIE is inquiring for 1,000, 40-ton flat cars.

THE DAVIDSON CHEMICAL COMPANY, Baltimore, Md., is inquiring for 20, 70-ton flat, and 20, 50-ton hopper cars.

THE VIRGINIAN, reported in the *Railway Age* of October 10 as inquiring for 1,000 steel coal cars, has renewed its inquiry for this equipment. The cars are to have a capacity of 120,000 lb.

THE PARAGON REFINING COMPANY, Toledo, Ohio, has ordered 100, 10,000-gal tank cars from the Haskell & Barker Car Company, Inc., Chicago. The acceptance of the order marks the entrance of the car company into a new field of car building.

THE UNION PACIFIC, reported in the *Railway Age* of January 23 as inquiring for 4,000 refrigerator cars, has ordered this equipment from the following builders: 900 cars from the Pullman Company, 900 from the American Car & Foundry Company, 300 from the Mount Vernon Car & Foundry Company, 700 from the Haskell & Barker Car Company, 200 from the Pacific Car & Foundry Company, and 1,000 in its own shops.

Passenger Cars

THE GRAND TRUNK is in the market for 50 baggage and express cars, 15 express refrigerator cars and 10 express horse cars.

THE PORTUGAL RAILROAD COMMISSION is inquiring for 91 passenger train cars of various types. Further information may be obtained from the American Machinery Syndicate, 37 West 39th street, New York.

Supply Trade News

The Streator Car Company, Streator, Ill., is building a new plant at Kankakee, Ill., which will be devoted to the building of steel cars.

C. E. Bransfield, foreman for the Standard Car Construction Company, Masury, Ohio, has been promoted to general superintendent.

The Union Tank Car Company has acquired 120 acres of land in Lima, Ohio, with the intention of erecting car shops in the future on the site.

The capital stock of the Highland Iron & Steel Company, Terre Haute, Ind., has been purchased by the American Chain Company, Inc., New York City.

Evarts Shankin Barnum, of the G. M. Basford Company, New York, died at his home in Ridgewood, N. J., on February 3, of pneumonia, after an illness of eight days. Mr.



E. S. Barnum

Barnum was born in Louisville, Kentucky, in 1883 and received his education at Perdue University, from which he graduated in 1906. His entire business life was connected with railroad work. Immediately upon his graduation from the University, he entered the service of the Pennsylvania Lines West as apprentice and worked successively as apprentice, machinist, foreman, general foreman, roundhouse foreman and motive power inspector. Leaving the railroad in 1917 he joined the editorial staff

of the Simmons-Boardman Publishing Company as an associate editor of the *Railway Age* and the *Railway Mechanical Engineer*, and later became associated with the G. M. Basford Company and was in charge of the copy department of that company.

The Q and C Company, New York, has purchased the Everett Snow Melting Device, formerly manufactured by E. A. Everett, 123 Liberty St., New York.

Frederick W. Renshaw, president of the Globe Seamless Steel Tubes Company, Chicago, died on February 1 at his home in Evanston, Ill., at the age of 39 years.

B. G. Koether, district sales manager at Detroit, Mich., for the Hyatt Roller Bearings Company, New York, has been promoted to vice-president, with headquarters at Harrison, N. J.

The Air Brake Safety Appliance Company has been incorporated at Indianapolis, Ind., with a capital of \$10,000 for the manufacture of a safety device to be used in connection with air brakes.

W. J. Stanton, for a period covering 18 years in the testing, engineering and sales departments of the General Electric Company, has taken a position with the Ohio Brass Company, Mansfield, Ohio.

F. H. Maple, superintendent of the Point St. Charles (Que.) plant of the Canadian Steel Foundries, Ltd., Montreal, Que., has been appointed foundry superintendent of the American Steel Foundries' plant at Alliance, Ohio.

H. B. Kirkland has been discharged from service as captain in the Construction Division of the United States Army assigned to the Chicago Ordnance Storage Depot, effective January 15, and has resumed his duties as president of the **Concrete Mixing & Placing Company**, Chicago.

William R. Mau, general superintendent of the **Rich Tool Company**, Chicago, has been appointed Chicago district manager of the **Vanadium-Alloys Steel Company**, Pittsburgh, Pa., with offices at 566 West Randolph street, Chicago. Mr. Mau succeeds **T. W. Bigger**, who has resigned to become general manager of **C. M. Bigger & Company**, Chicago.

Arthur E. Blackwood, manager of the New York office of the **Sullivan Machinery Company**, Chicago, has been promoted to vice-president in charge of finance and accounting, with headquarters at Chicago. **Louis R. Chadwick**, manager of the company's office at Spokane, Wash., has been transferred to the New York office, succeeding Mr. Blackwood. **Robert T. Banks**, sales engineer, with office at El Paso, Tex., has been promoted to manager of the Spokane office, succeeding Mr. Chadwick.

H. P. Wingert has resigned his position as general purchasing agent of the **American Brake Shoe & Foundry Company** to become the president of the **American Commodities Company** with offices at 30 Church street, New York. This company is a new organization recently formed to engage in the handling of fuel, foundry supplies and railway materials. Mr. Wingert is well known in railway circles. Beginning his business life as a messenger boy, he became a telegraph operator and later held positions of responsibility with the **Pennsylvania Railroad**, the **New York Central** and the **Central Railroad of New Jersey**. He resigned as assistant to the purchasing agent of the



H. P. Wingert

Central Railroad of New Jersey to become purchasing agent of the **American Brake Shoe & Foundry Company** at the time of its organization in 1902. In 1918 Mr. Wingert was made general purchasing agent of the same company, which position he held until taking up his new duties as president of the **American Commodities Company**.

At the annual meeting of the board of directors of the **Railway Audit & Inspection Company, Inc.**, Philadelphia, Pa., held on January 23, 1920, **E. C. Hathaway** resigned as president, effective February 1, and was elected chairman of the board. The following officers were also elected: **H. H. Brown**, president, succeeding Mr. Hathaway; **T. C. Cary**, first vice-president and general manager; **C. E. Horney**, second vice-president and treasurer; **W. W. Groves**, third vice-president and sales manager; and **Walter H. Taylor**, secretary.

The **Orton & Steinbrenner Company**, Chicago, has established six new agencies and offices in this country and Canada. The agencies are: The **Bonsack Machinery Company**, 1601 Boatman Bank Building, St. Louis, Mo.; the **Utah Machinery Company**, Salt Lake City, Utah; the **Southern States Machinery Company**, Birmingham, Ala., and **Wonham, Bates & Goode**, 145 St. James street, Montreal, Que. New offices have been established at 1707 Franklin street, Denver, Colo., in charge of **P. Kranefeld**, and at 505 Lumsden building, Toronto, Ont., in charge of **T. J. McGovern**. The Minneapolis, Minn., office, in charge of **Frank J. Ross**, has been

moved from the Corn Exchange building to the Metropolitan Life building.

S. F. Bowser & Co., Fort Wayne, Ind., has organized a subsidiary company to be known as the **S. F. Bowser & Co. of Texas**, at Dallas, for the sale and distribution of Bowser products in that state and parts of the adjoining states of Oklahoma, Arkansas and New Mexico. The company has at present an office at Dallas. The purpose of the new company is to more easily take care of the sales end of the business in that territory and to relieve the Fort Wayne office of the details connected with the work that will be carried on there. A warehouse similar to those of the company at Albany and San Francisco will be erected at Dallas. The officers of the new company are as follows: **S. F. Bowser**, president; **S. B. Bechtel**, vice-president; **H. J. Grosvenor**, secretary; **W. G. Zahrt**, treasurer, and **L. P. Murray**, manager. In addition, at the home plant, a large modern power plant is to be built, and a pit for about 75 car loads of coal. The Bowser company will also put up a building for the bank recently formed for the employees. It is to be built near the home plant and will be for the convenience of the community as well as the employees.

Harry S. Goldman has been appointed northwestern representative of the **A. G. A. Railway Light & Signal Company** and sales manager of **Gifford & Co.**, with headquarters at Chicago, succeeding **O. E. Berggren**, who has resigned to become connected with the **American Magnesia Products Company**, Chicago. Mr. Goldman was born at Indianapolis, Ind., on January 26, 1892, and was graduated from **Rose Polytechnic Institute** in 1914. He entered the signal department of the **Illinois Central** on October 1, 1916, and continued in the employ of the **Illinois Central** until September, 1917, when he entered the **United States Army** as a lieutenant of Engineers. He was discharged in



H. S. Goldman

May, 1919, and returned to the signal department of the **Illinois Central** as signal draftsman, continuing in this capacity until January 12, 1920, when he was appointed northwestern representative of the **A. G. A. Railway Light & Signal Company** and sales manager of **Gifford & Co.**, with headquarters at Chicago.

The **Western Electric Company, Inc.**, 195 Broadway, New York, has reorganized its railroad representative staff under the direction of **George H. Porter**, manager of the railroad department, as follows: The Western district representatives are: **J. P. Casey**, St. Louis, Mo.; **W. J. Schott**, Kansas City, Mo.; **George Chestnut**, Houston, Tex.; **G. N. Hoffman**, Salt Lake City, Utah; **W. H. Laufenberg**, Denver, Colo.; **J. E. Coad**, Dallas, Tex. Those for the Coast district are: **I. A. Shorono**, Seattle, Wash.; **J. G. Loomer**, Los Angeles, Cal.; **H. A. Case**, San Francisco, Cal.; **Jack F. Ryan**, Portland, Ore.; **J. H. Kelley**, Tacoma, Wash.; **C. A. Martin**, Spokane, Wash. Central district: **Otto Danielson**, Chicago; **E. B. Elliott**, Chicago; **A. J. McCall**, Omaha, Neb.; **Tom Wheatley**, Cleveland, Ohio; **R. D. Eves**, Cincinnati, Ohio; **W. H. McGann**, Cincinnati, Ohio; **R. W. Tenbroeck**, Toledo, Ohio; **C. E. Roberts**, Indianapolis, Ind.; **W. H. Tompkins**, Milwaukee, Wis.; **E. B. Denison**, Minneapolis, Minn.; **G. E. Brown**, Duluth, Minn.; **A. W. Hillis**, Detroit, Mich.; **A. Schwenck**, Grand Rapids, Mich. Eastern district: **Oscar Lepper**, Pittsburgh, Pa.; **A. B. Thomson**, New York; **Charles R. Wharton**, Philadelphia, Pa.; **Fred Jaeger**, Philadelphia, Pa.; **James**

Stuard, Philadelphia, Pa.; E. R. Morgan, Boston, Mass. Southern district: William Lancaster, Richmond, Va.; H. B. Stanton, Savannah, Ga.; W. R. Phillips, Jacksonville, Fla.; J. W. Smith, Atlanta, Ga.; A. L. Frankenberger remains at St. Paul, Minn., and Sidney Greenfield at Baltimore, Ma.

A. N. Lucas, superintendent of the locomotive shops of the Chicago, Milwaukee & St. Paul, at Milwaukee, Wis., has been appointed district manager of the **Oxweld Railroad Service Company**, with headquarters at Chicago.



A. N. Lucas

Iowa. He remained at Dubuque until April, 1904, then being transferred to the Milwaukee shops, where he was promoted to general foreman of boiler work for the entire system. In May, 1917, he was promoted to assistant superintendent of motive power and a year later was placed in charge of the locomotive department of the Milwaukee shops as shop superintendent. Mr. Lucas is a past president of the Master Boilermakers' Association, and is at the present time a member of the executive board of that organization.

American Car & Foundry Has Substantial Interest in Canadian Company

William H. Woodin, president of American Car & Foundry Company, in announcing recently that his corporation had bought a substantial stock interest in the Canadian Car & Foundry Company, said that "this purchase has been made as a direct response to Sir Henry Drayton, Minister of Finance, in his recent address here to American industrialists and capitalists, to make investments in Canada. As far as our interests are concerned, the Canadian Car & Foundry Company will remain under the same management and there will be practically no change in its present organization."

At the last meeting of the board of directors Mr. Woodin was elected chairman of the executive committee of the Canadian concern, Jonathan Curry chairman of the board, and W. W. Butler, president of the company. Andrew Fletcher, president of the American Locomotive Co., and Lewis A. Clarke, president of the American Exchange National Bank, are also directors of the Canadian company.

"The plants of the Canadian Car & Foundry Company," said Mr. Woodin, "are in excellent condition, and it has a thoroughly efficient, loyal organization. It is in a position to do a great deal of work, and if the very great demand for railroad equipment that is necessary to carry on the railroads of Canada materialize this company should be very profitable for some time to come."

"There are very many lines of mutual co-operation between the two companies which will work out to the great benefit of both of them. This is especially true in the export business, and we feel that there is going to be a great deal of this in the immediate future. The Montreal works of the Canadian Car & Foundry Company are especially advantageously placed to serve the export trade."

Speaking of the outlook for equipment business, Mr. Woodin added: "Since my return from Europe, I have been

more and more impressed with the fact that there is a very great number of equipment orders awaiting the equipment companies in this country. The railroads of every country in the world are greatly in need of locomotives, cars and rails, and as they must be kept in condition to carry on the commercial requirements of these countries, vast purchases must be made along these lines. I do not want to appear too optimistic, but I cannot help seeing the tremendous world requirements in these commodities."

Mr. Woodin also said that there is little probability of foreign equipment makers competing with American companies for domestic business; that American Car and Foundry Company is not doing much in the car building line, but has plenty of repair work on hand.

New Officers of the Murphy Varnish Company

As briefly noted in the Supply Trade News column of the *Railway Age* of January 23, 1920, John J. Nicholson has been elected president of the **Murphy Varnish Company**, Newark, N. J.; Charles J. Roh has been elected vice-president and a member of the board of directors; Franklin Murphy, Jr., has retired from the presidency to become chairman of the executive committee and

Franklin Murphy, Sr., former governor of New Jersey, remains chairman of the board or directors.

Franklin Murphy, Jr., who becomes chairman of the executive committee of the company, is the son of Franklin Murphy, the founder of the company. He has been associated with the Murphy Varnish Company since immediately after his graduation from Princeton in 1895. He was successively a factory man, an office man and a salesman, and after a thorough training in all



Franklin Murphy, Jr.

branches of the business, became an executive of the company. He was elected president and remained at the head of the company until January 1 of this year. He has been an influential factor in the rapid progress of the business in recent years, and retires from the presidency owing to ill health.

John J. Nicholson, the new president of the company, succeeding Franklin Mur-

phy, Jr., was born in Cleveland, O., in 1861. He started in business with the company in 1888 as cashier and bookkeeper at the Chicago branch. He became private secretary to Governor Murphy in 1893, resident manager at Boston in 1896, Newark resident manager in 1905, general sales manager in 1906, vice-president with residence in Chicago in 1909, and first vice-president in 1915. Mr. Nicholson as resident manager in the different branches of the company and later as



J. J. Nicholson

general sales manager has acquired a wide acquaintance among paint and varnish men and among the railroads and other important buyers of painting materials. Of late years

he has represented the company at most of the important conferences in the trade.

C. J. Roh, general sales manager and newly appointed second vice-president of the Murphy Varnish Company, is 40 years of age. He joined the Murphy forces as an office boy in 1900. He was successively assistant to the present manager at Newark, and manager at Boston and when the company consolidated its Boston and Newark branches was made manager at Newark, in 1910. He was appointed general sales manager in 1919. Mr. Roh was given charge of the jobber business of the company a year ago as a part of his duties, and has seen it grow under



C. J. Roh

his direction from a small beginning to one of the most important branches of the business.

E. Fred Wood, formerly vice-president of the **International Nickel Company**, New York, died suddenly at New York on January 5. Mr. Wood was born in Milwaukee on August 28, 1858, and was educated in the public schools of his native city and later graduated from the University of Michigan. After leaving college he devoted himself to the study of metallurgy and in connection with his studies made extensive trips through the various mining camps of the west. He lived for a year at Leadville and other mining towns, where he pursued his studies and obtained his practical experience. He later entered the employ of the Carnegie Steel Company and rose to the position of assistant general superintendent of the Homestead plant, which position he held for a number of years, and, during the period of the big strike at the plant, when Mr. Frick was shot, Mr. Wood was in entire charge of the plant.

He was looked upon by Mr. Carnegie and his associates as one of the valuable men of the organization. He joined the International Nickel Company at the time of its organization, becoming first vice-president of the company and a member of the board of directors and of its executive committee, and he was an important factor in developing the mining, smelting and refining business of the company. When the United States entered the World War, Mr. Wood resigned his official connection with the International Nickel Company and became a member of the Committee on Production of the War Industries Board, serving continuously on this board during the entire period of the war, without compensation.

Annual Dinner of Chicago

Railway Equipment Company

The twenty-seventh annual dinner of the Chicago Railway Equipment Company was held at the Union League Club in Chicago on the evening of February 3. The annual dinner of this company has grown from one which formerly was participated in merely by the directors and officers of the company to one which is now attended by numerous business men in addition to the officers of the company. The number of guests at the annual dinner was about 75. President E. B. Leigh acted as toastmaster and the following addresses were made: "The Importance of Educating the Public Regarding the Problems of Railway Maintenance," by Bruce V. Crandall; "Railroad Morale," by Samuel O. Dunn; "The Rights of Labor Combinations in Relation to

the Public Interest," by James A. Emery; and "Excess Prophets," by Frank W. Noxon.

Mr. Emery, who is an eminent lawyer, discussed fully the question of the legal as well as the moral right of employees of essential industries, especially transportation, to engage in strikes the obvious purpose of which is to force the giving of concessions to them by depriving the public of essential services and commodities. He made clear that from an economic standpoint strikes in essential industries are not merely attacks upon employers but present a direct issue between the public and the employees. He made clear that from a legal standpoint the public has power, not merely to place restrictions upon strikes in essential industries, but absolutely to prohibit them. He referred to the law creating an industrial court which has been adopted in Kansas, and suggested that a result of the creation of this court is likely to be a body of law which will serve to protect the interest and rights of the public from attacks made upon them by labor combinations.

Trade Publications

BRAKE ROD JAW.—The Schaefer Equipment Company, Pittsburgh, Pa., describes and illustrates in a four-page pamphlet the Schaefer drop-forged brake rod jaw for attachment to brake rods. The method of applying the jaw is simple and is illustrated. It is claimed that the jaw may be removed and reattached without any danger from failure and that it may be applied and reapplied without loss. The pamphlet also shows the results of pulling tests on six different jaws fastened on $\frac{7}{8}$ -in. brake rods, which were made at the Pittsburgh Testing Laboratory.

STEEL PIPE.—National Bulletin No. 24A, issued by the National Tube Company, Pittsburgh, Pa., shows graphically the remarkable growth of the steel pipe industry from 1888 to the present time. The chart indicates a decrease in the production of wrought iron pipe during this period. Quotations are given from the editorial columns of three current periodicals in the iron field to show the reasons for the popularity of steel pipe and its probable permanence. Included in the bulletin is a chart showing the relative production of wrought iron and steel skelp from 1888 to 1918.

VALVES.—Catalogue and price list No. 10 of Nelson valves has been issued by the manufacturers, the Nelson Valve Company, Philadelphia, Pa. The book contains 156 pages, 5 in. by $7\frac{1}{2}$ in., and is bound in cloth. It is divided into three parts, devoted respectively to bronze, iron and steel valves, with an introduction describing the general features of the design and the service rendered. The valves are made in gate, globe, check and non-return patterns for practically every class of service found in power plant work, etc. The book contains numerous illustrations and the data is conveniently arranged.

INSULATION PRODUCTS.—The Franklin Manufacturing Company, Franklin, Pa., has issued a 77-page catalogue, entitled Heat Insulations. This catalogue contains descriptions of the company's insulation products, including 85 per cent magnesia pipe covering, railroad special pipe covering, Franklin car lining, asbestos millboard, wool-felt covering, etc. Packing and shipping directions are included. The back part of the catalogue contains considerable engineering information in the form of tables and data to be used in the solution of heat insulation problems. Instructions for the use of these tables are given and several concrete examples are worked out.

DRAFT GEARS.—Force and Its Applied Principles is the title of a 28-page booklet, bound in stiff paper cover, which has just been issued by the Union Draft Gear Company, Chicago. The booklet explains concisely and non-technically the elementary relationship of force and motion, defining the terms used. How these principles apply to the operation of the draft gear is then set forth and the booklet concludes with a discussion of draft gear capacity and the essentials of draft gear testing. A table for the conversion of miles per hour into height of fall in feet, for use in calculating the energy in moving cars for speeds from 1 to 10 miles per hour by half-mile intervals, is included.

Railway Officers

Railroad Administration

Central

Ralph Blaisdell has been appointed treasurer of the Railroad Administration, with headquarters at Washington, D. C., succeeding **Charles A. Lutz**, resigned.

George H. Parker, financial assistant to Walker D. Hines, director general, with headquarters at Washington, D. C., has been appointed controller for the Railroad Administration, with the same headquarters; **D. E. Brown**, assistant director of accounting for the Railroad Administration, with headquarters at Washington, has been appointed assistant controller.

Federal and General Managers

Charles O. Jenks, assistant general manager of the Great Northern, with office at Seattle, Wash., has been appointed assistant federal manager, with headquarters at St. Paul, Minn.

Operating

L. E. Strouse has been appointed trainmaster of the Dubuque and Cedar Rapids districts of the Minnesota division of the Illinois Central, with headquarters at Dubuque, Iowa, succeeding **H. G. Duckwitz**, who has been assigned to other duties.

J. H. O'Neill, general superintendent of the Western division of the Great Northern, with headquarters at Seattle, Wash., has been appointed assistant general manager of the lines west of Williston, N. D., with the same headquarters, succeeding **C. O. Jenks**, promoted; **F. S. Elliott** has been appointed to succeed Mr. O'Neill.

E. W. Scheer, general superintendent of the Northwest district of the Baltimore & Ohio, Western Lines, with headquarters at Cleveland, Ohio, has been transferred to the Maryland district, Eastern Lines, with headquarters at Baltimore, Md., succeeding **M. H. Cahill**, resigned; **E. A. Peck**, assistant to the general manager of the Eastern Lines, with headquarters at Pittsburgh, Pa., has been appointed to succeed Mr. Scheer.

M. C. Blanchard, acting superintendent of the Missouri division of the Atchinson, Topeka & Santa Fe, with headquarters at Marceline, Mo., has been appointed superintendent of the Illinois division, with headquarters at Chillicothe, Ill.; **C. L. Mason**, acting superintendent of the Kansas City division, with headquarters at Kansas City, Mo., has been transferred, succeeding Mr. Blanchard, and **H. M. Duncan** has been appointed to succeed Mr. Mason.

Engineering and Rolling Stock

F. K. Tutt, acting general master mechanic of the Missouri Pacific, with headquarters at St. Louis, Mo., has been appointed mechanical superintendent of the Missouri, Kansas & Texas.

Corporate

Executive, Financial, Legal and Accounting

F. M. Rivinus, general solicitor of the Norfolk & Western for the Railroad Administration, has been appointed corporate general solicitor with headquarters at Philadelphia, Pa.

W. T. Tyler, director of the Division of Operation of the Railroad Administration, has been elected vice-president in

charge of operation of the Northern Pacific, but will remain with the Railroad Administration until March 1.

I. W. Booth, assistant secretary of the Norfolk & Western, has been appointed secretary and assistant treasurer; **L. W. Cox** has been appointed assistant secretary, both with headquarters at Philadelphia, Pa.

William G. Macdowell, vice-president of the Norfolk & Western has been appointed assistant to **N. D. Maher**, notice of whose election as president of that road was given in the *Railway Age* of January 30 (page 396).

Thomas M. Pierce, general counsel for the Terminal Railroad Association of St. Louis, Mo., has been promoted to acting president and a director of the association, succeeding **William S. McChesney, Jr.**, deceased.

J. W. Coxe, federal auditor of the Norfolk & Western, has been appointed controller of the Norfolk & Western Railroad Company; **W. H. Wilson**, auditor of disbursements for the Railroad Administration, has been appointed assistant controller, and **Joseph B. Lacy** has been appointed treasurer, each with headquarters at Roanoke, Va.

A. C. Needles, federal manager of the Norfolk & Western, and prior to federal control, general manager, has been elected vice-president in charge of operation, with headquarters at Roanoke, Va. **T. S. Davant**, traffic assistant of the Pocahontas region, has been elected vice-president in charge of traffic, with headquarters at Roanoke. **E. H. Alden**, secretary and treasurer, with headquarters at Philadelphia, Pa., has been elected vice-president in charge of finances, with the same headquarters; and **Charles S. Churchill** has been re-elected vice-president in charge of real estate, purchases and valuation, with headquarters as before at Roanoke.

Operating

W. M. Neal has been appointed assistant general superintendent of the Quebec District of the Canadian Pacific, with headquarters at Montreal, Que.

Obituary

Edward P. Ripley, chairman of the board of directors and formerly president of the Atchinson, Topeka & Santa Fe, died in Santa Barbara, Cal., February 4, as the result of complications following an operation performed several months ago. An account of Mr. Ripley's career will be published in next week's issue of the *Railway Age*.

William S. McChesney, president of the Terminal Railroad Association of St. Louis, died at his home in St. Louis, Mo., January 28. Mr. McChesney was born August 5, 1856, at

Cynthiana, Ky. After being graduated from the Transylvania University at Lexington, Ky., he began railroad work at the age of twenty-three as passenger agent of the Ohio & Mississippi, now part of the Baltimore & Ohio. Later he became general traveling passenger agent of the Louisville, Cincinnati & Lexington and then general agent of the Louisville & Nashville at Lexington. While holding the position just named he was promoted to superintendent of the same road at St. Louis and some



Wm. S. McChesney, Jr.

time afterwards appointed vice-president and general manager of the Terminal Railroad Association. In 1903 he was elected president.